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A McGRAW-HILL PUBLICATION

APRIL 1943

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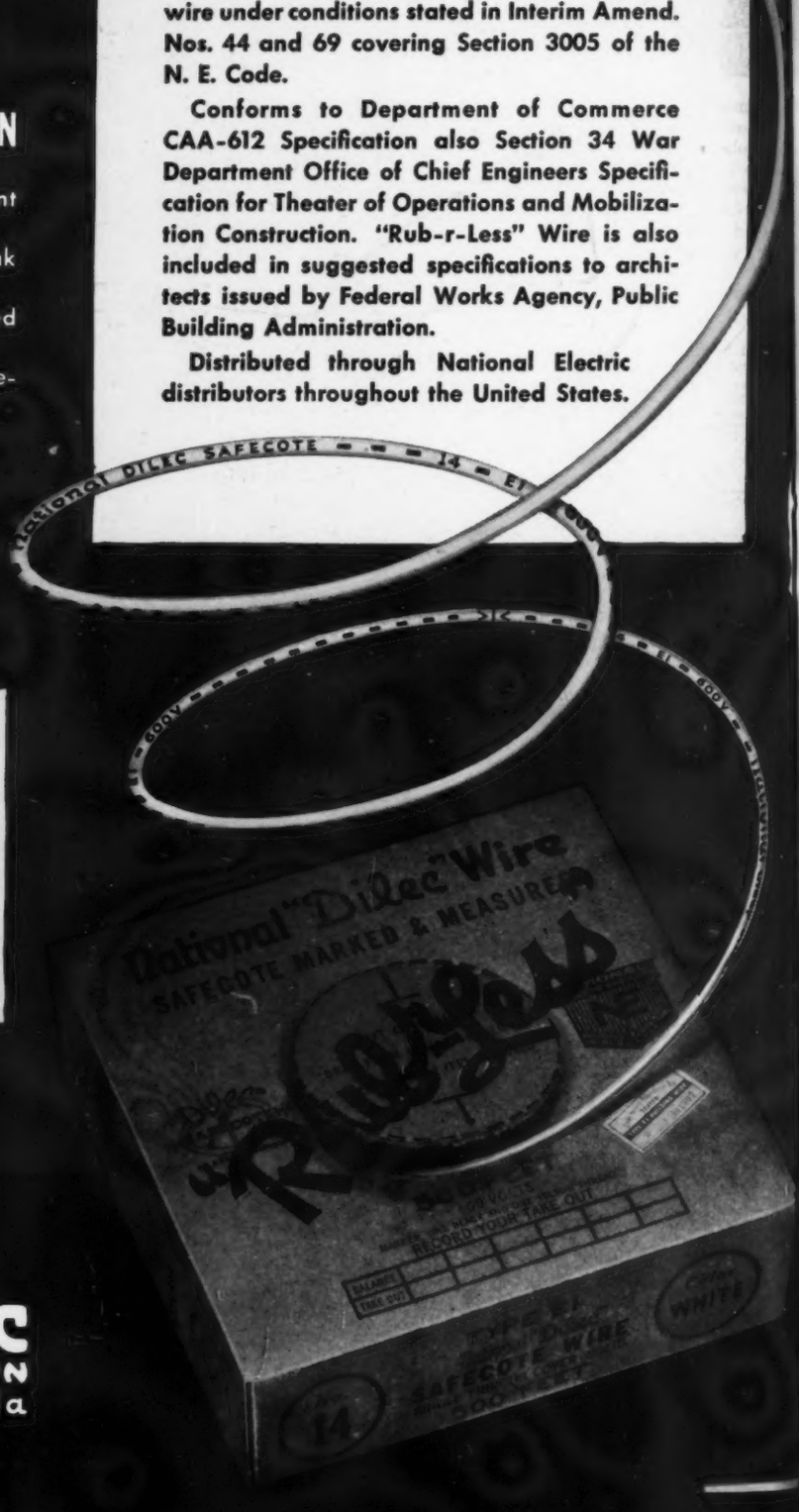

National Electric
PRODUCTS CORPORATION
Pittsburgh, Pennsylvania

Woman employee at North American Aviation, Inc., Inglewood, Calif., works on electrical system of Wright motor before it moves to final assembly. Safety-conscious readers who jump to criticize the bracelet—and possibly the wedding band—will note that the hazard of moving machinery is absent. Even so, the best place for the bracelet is at home. Kodachrome from OWI.

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FACTORY

MANAGEMENT AND MAINTENANCE

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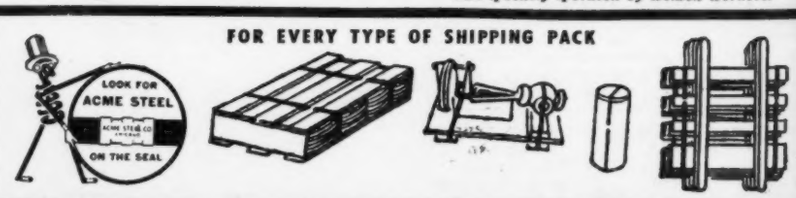

ACME STEEL COMPANY
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Food—The Deciding Issue

Our food problem remains to be solved

THE first thing the Germans did when they occupied Czecho-Slovakia, Poland, Belgium, France – was to empty all warehouses. Everything went into trucks headed for Germany.

The Nazis knew that this war would be won by the army that had the most supplies and the best supply system.

The Nazis knew that supplies are as essential as guns. They knew that the most essential of all supplies is . . . food.

Being the only people on earth who can watch women and children starve, the Nazis seized upon food as their most powerful instrument for disciplining the masses. They added famine to their arsenal of conquest.

The flocks and herds of Europe are being consumed with alarming rapidity. The desperate shortage of meats and fats is growing steadily worse. Our Allies are short of certain foods that we must supply if we expect them to carry on.

And as we supply them, as our imports are curtailed, as our fighting men consume more than they do in civil life, and as we fail to increase our production rapidly enough . . . we, too, become short of certain foods.

Former President Herbert Hoover, speaking before a conference of the Governors and Representatives of twelve Mid-Western farming states in Des Moines on March 15th, sounded the warning that American agriculture, beset by Washington bungling on manpower, farm machinery and price systems, strangling production and distribution, is facing a deterioration which may bring on a national food shortage such as led to the collapse of Russia, the defeat of Germany in the first World War and the fall of France in the present war. Unless this deterioration is stopped, warns Mr. Hoover, we cannot hope to win the present conflict.

Complications of similar magnitude face the food processor and the distributor.

Never in the history of the world has man's dependence on food been so crucial. Yet it is not easy for us to grasp the full significance of the crisis. We are so accustomed to finding milk, eggs and butter on our doorsteps every morning, we are so used to filling our pantries from the shelves of our grocers and markets that we accept food as something that is due us on demand. We do not stop to think that we never are more than a few meals ahead of famine.

But this picture has changed. Now we are faced with food rationing, and every day the shelves of our food markets become more bare.

* * *

Let it be noted that the appointment of two Food Administrators has not solved the food problem. It is still with us; daily it becomes more critical. Unless it is solved, and solved quickly, the very food that ex-Food Administrator Wickard said would "win the war and write the peace" may lose the war and lose the peace.

Put very simply and clearly, the food problem amounts to this: we are trying to feed upward of 200 million people. We are trying to do it with the farms and other facilities that heretofore have been capable of feeding about 145 million people (our present population plus a 5% surplus).

Had the Government foreseen the need and planned ahead, we could have begun by 1941 the enlargement of our farm production and food processing capacity. Two irreplaceable years have been lost!

The gravity of the situation becomes apparent when we consider that 50,000 factories are required to process our foods. Food processing not only is America's biggest industry – it is one of America's most important for, without processing, most foods would perish before they could reach the consumer. The term "processing" covers the salting, drying, smoking, pickling, chilling, canning, packing and other methods of preservation that make it possible for us to eat in 1943 food that was produced in 1942. Few realize that most of the food we shall eat in 1943 was produced and processed last year, that most of the seed we plant this spring will grow food for 1944 or perhaps later.

In one important process of preservation, tin and rubber are vital materials. When the Japs captured Malaya and the Netherlands East Indies more than half of the world's tin and nearly all of its rubber fell into their hands. This forced drastic changes upon our entire food economy. The importance of tinplated steel containers, tops for glass jars and rubber gaskets is fairly obvious . . . metal food containers alone consume, every year, more than 2,700,000 tons of steel.

The aggression of Japan has snared our whole food industry in a maze of intricate packing problems. It has enforced recognition of a new principle of food technology, i.e., that the *method* of food preservation is determined by the *type* of container available. The tin, steel and rubber stringency compels many food processors to adopt

unfamiliar methods – methods that call for a great deal of new equipment. This, in turn, involves the use of critical materials that are so urgently needed for other war purposes.

This conversion of the food processing industry to meet these exacting restrictions has been greatly complicated by two factors that have increased its wartime burden. Indeed, it is these that provide the principal reason for civilian food rationing.

The first of these is the task of feeding our armed forces overseas. Allied ships are being sunk at an alarming rate and the loss of cargo is considerable.

The second factor gravely augments the first. Under Lend-Lease our country is undertaking to feed our Allies to the extent of approximately 60 million people.

Types of food required for Lend-Lease and the armed forces are the finest we can produce. They are the high protein foods, especially meats, cheese and milk; and the protective foods which rate high in vitamin content. Peculiarly enough, the more valuable a food is from a nutritive angle, the more specialized is the processing required to preserve it.

The food processing industry, handicapped as it is, is meeting today's challenge with resourcefulness and enthusiasm . . . despite container complications and shipping shortages.

This is the tenth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

It is accomplishing its Herculean task by resurrecting and modernizing a method of food preservation that is as old as mankind. Probably you have read a great deal about dehydration. You actually may have eaten dehydrated food, but right now nearly every bit of dehydrated food is earmarked for the armed forces or for Lend-Lease.

Food processing never will be as spectacular as the production of bombers or tanks. But under today's conditions, the performance of the food processor is no less important . . . no less inspiring. When we consider that dehydrated food is compressed into solid blocks with a density nearly equal to that of coal, so that almost a whole meal can be carried in a vest pocket, and that half of the shipping space is thereby saved in transportation, we begin to appreciate what the processors have contributed to meet the food problem imposed by the war.

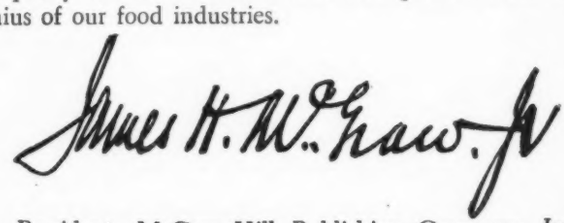
But they have not only contributed new methods, they are achieving new highs in production. And now they are asked to do what borders on the impossible. Consider dehydrated egg powder. Normal production in pre-war years was about 3,000,000 lbs. In 1940 this was increased two and one-half times, in 1942 it was stepped up again, this time forty-fold. And in 1943 the call is for another 60 per cent boost, to make a total of 480,000,000 lbs. Dried milk powder production of 350,000,000 lbs. in 1940 must be increased to 685,000,000 lbs. in 1943.

Vegetables, which were a small item to the processor before the war, now are dehydrated in enormous quantities. The vegetable dehydration industry has had to grow by leaps and bounds without benefit of the high priorities accorded to arms, ship and aircraft building. Production of dehydrated vegetables in 1942 was four times that of 1941, and 1943 calls for a sixteen-fold increase over 1942.

Total dehydrated food production in 1943 is scheduled at 1,750,000,000 lbs., dry basis . . . *all for export*. Multiply that by 10 and you have a rough approximation of the astronomical amount of raw materials that will have to be produced.

Many problems remain to be solved in the troublesome days that lie ahead. But with all his resourcefulness, man has little control over the weather. A severe drought could wipe out all of man's carefully laid plans. If we are tempted to reassure ourselves with the thought that the food situation probably is not so serious as it is painted, it will be well to remember that last year's crop increase over 1941 was due to better than average growing weather.

The war-bred food crisis that now confronts us will be met only by immediate measures to insure a food production ample to allow for adverse weather conditions. The food processing industry is capable, but has not been granted the needed help, in coping with its tasks. The food problem as a whole involves all three functions of production, processing and distribution. And if we are to master the problems that now beset us, all three of them must be coordinated under a single administrative control. "Food will win the war and write the peace". But if American food is to do that double job, we must develop a capacity for food *administration* comparable with the genius of our food industries.



President, McGraw-Hill Publishing Company, Inc.

FACTORY
MANAGEMENT AND MAINTENANCE

L · C · MORROW · EDITOR

Don't Misuse Wage Incentives

Since the days of Frederick W. Taylor, incentive payment has been one of the productive tools of management. Used properly, it has been responsible for reduced cost of production, bigger pay envelopes, higher profit, and lower prices all at the same time.

Incentive payment of workers has had its ups and downs with organized labor. Acceptance and rejection have depended upon the personnel of the leadership, and have varied from cooperative study of methods and rates to demands for replacement by straight-time payment.

Management, as a rule, has favored incentive payment, but has not adopted it as widely as it should have in the interest of the most economical production.

Under pressure of war output it would seem that incentive payment should flourish. According to the true concept of the place of this device, more war products should be turned out in less time with bigger take-away for labor.

That is happening to some extent. In some cases, however, incentive payment is being used by both organized labor and plant management as a device by which wages can be increased. Not for bigger take-away because of greater production, but bigger take-away to make a higher *rate* of pay, which otherwise might not be possible under the wage-stabilization order.

How is incentive payment being used for this purpose? Not by out-and-out arbitrary increases, in these cases; but by restudy of jobs, followed by rate boosts. According to reports, the restudy is made principally for the purpose of raising wages—sometimes at the request of labor, sometimes on management's own initiative.

In the American economy, it is the higher rate of output per unit of payment that means everything. It is only because of this higher rate that there is something left over for management and for the consumer after the worker takes his increased pay. This principle must not be lost sight of for emergency reasons.

The whole procedure of paying by results will be in a sorry mess after the war unless the fundamentals of incentive payment are held on to. The immediate post-war period will be no time in which to have to try to go back to pick up a set of principles.

Roger D. Lapham, industry member of the War Labor Board, in a recent statement, described truly the situation that will result if wage stabilization is not maintained. He said:

"Because of the manpower shortages, thousands of individual employers are asking approval of voluntary wage increases in order to hold their workers, in competition with industries which pay higher wages. If such increases are generally approved, they will defeat the whole purpose of the stabilization program without relieving the over-all labor shortage. The inevitable result of competitive bidding for labor by voluntary wage increases would only hasten inflation."

The fact that part of the increases are given under the guise of incentives will not lessen their inflationary effect. Obviously, wholesale increases will defeat management's objective anyway. They may hold employees for a time, but the inflationary spiral is bound to work, and the whole thing will have to be done over.

Incentive payment has its rightful place today, as well as in peacetime. In fact, it probably should be adopted in more plants. But it should not be used as a subterfuge to raise wage rates. If incentive payment can be limited to the objective of providing extra pay for extra work, it will be available after the war as an unsullied tool for use in bringing about an amount of production not hitherto experienced, but which will be absolutely necessary for the standard of living that will be demanded.

L C Morrow

Will We Get L

MANAGEMENT naturally wants to know whether or not it should plan now to operate under a federal manpower control law, commonly called a "labor draft," along the lines of British National Service.

Barely more than a year ago the issue seemed a distant one. At that time FACTORY (See "Will Conscription for War Work Come?" February, 1942) observed: "We should see these changes . . . conscription of manpower for production as well as the armed services, conscription of women, as well as men, and conscription of management, as well as labor . . . taking shape within six months and hardening into complete reality by the end of 1943."

It is *not* a distant issue today. On the basis of a diligent inquiry in Washington, FACTORY has come reportorially to the view that:

1. A manpower control law is definitely in the cards.

2. It will probably be enacted within four months.

Outward appearances are against these conclusions. The Austin-Wadsworth Bill for National War Service, most prominent of legislative proposals along this line, is currently conceded little chance of passage by the journalistic railbirds in the capital. Against its chances stand these facts:

1. It is sponsored by Republicans (Sen. W. R. Austin of Vermont, and Rep. J. W. Wadsworth of New York).

2. It not only lacks White House approval, but there is little apparent steam behind it in Congress.

3. AFL and CIO are against it.

In its favor, however, are these factors:

1. It has been endorsed by the War Department.

2. Public opinion polls have repeatedly and consistently favored manpower legislation in principle.

FACTORY FORESEES

1

Labor draft law (Austin-Wadsworth Bill or Admi istration substitute) enacted within 4 months

2

Crucial manpower "squeeze," especially in labor shortage areas, within 2 months

3

Presidential veto of bills, if passed, for blank deferment of farmers and fathers

4

Probable conscription of managerial personn for war and government jobs

3. The Selective Service Act of 1940 was introduced under very similar circumstances (Curiously enough, it had the same sponsor, Wadsworth, in the House) and, at the time, seemed to have even less apparent chance of passage. Yet it did pass.

Interpreting the Paradox of Paul McNutt

The real question, however, is not whether the Austin-Wadsworth Bill as such will pass, but whether manpower legislation of some similar sort will pass. Underlying trends exist that make the latter seem a safe bet. These trends become visible only after a canvass of the key agencies and key personalities affecting the issue. Not the least of these is Paul V. McNutt who, at the time of this writing, is still Chairman of the War Manpower Commission.

On October 21, 1942, McNutt made one of the ablest statements on record *in favor of national service legislation*. Said he to the Senate Military Affairs Committee:

"We are encountering problems which are too complex for effective voluntary action . . . Under a national service act there would be an opportunity to administer with efficiency and precision."

Yet on March 1, 1943, this same Paul V. McNutt issued a statement at a press conference (re the Austin-Wadsworth Bill) which drew headlines like these throughout the nation: "McNutt Fights Bill for Labor Draft" (*New York Times*, March 2, 1943)

Labor Draft?

To "smoke out" White House, Rep. James W. Wadsworth of New York (standing) and Sen. W. R. Austin of Vermont are sponsoring bill for labor draft

Photographs in this article from Harris & Ewing

Under the Austin-Wadsworth Bill, women as well as men would be registered for national service; voluntary calls issued for large numbers to work on farms and in factories; unfilled quotas made up through Selective Service. Conscription of management men for war and government work is definitely intended

and "McNutt Objects to Drafting Labor" (*New York World-Telegram*, March 1, 1943).

Question: What made McNutt change his mind?

Answer: He didn't really.

As a matter of fact, the press and the headline writers read too much meaning into his statement (as, perhaps, he hoped they would). Actually, there is nowhere on record a statement by Paul McNutt to the effect that he is *opposed* to national service legislation or that he has *ever* changed his mind. All he *did* say on March 1 was this:

"I am determined to try the voluntary method and to do everything in my power—in all sincerity—to make the voluntary method work."

McNutt's apparent ambiguities should entitle him to the services of an interpreter. Very well, let's interpret. What he has really said, when you sum it up, is this:

"I have spoken my mind, but the Boss doesn't seem to agree. Therefore, rather than resign, I shall go on trying to do the job *his* way."

The White House Must Change Its Mind

We may expect, then, that whenever the White House signifies approval of a national service law McNutt will chime in heartily. In fact, he will be in a beautiful position to say: "I was really for it, all along,"

and the change of mind will be that of the White House, not McNutt. For he can claim with perfect justice that he has been, in a quiet sort of way, consistent throughout.

However, the Austin-Wadsworth Bill, *as it stands*, may never gain White House approval, War Manpower Commission endorsement, or Congressional passage. It does not conform to WMC's idea of what such a bill should contain. For that matter, the War Department does not concur very strongly in the Bill's idea of making Selective Service the operating mobilization agency.

But this Bill, revised, may pass. Or it may arouse the introduction of a more satisfactory bill which can pass. Indeed, when FACTORY asked a top-ranking WMC official whether WMC itself might initiate a rival bill, if the Austin-Wadsworth Bill should begin to show real strength, the reply was:

"That is easily conceivable."

FOR A LABOR DRAFT—Secretary of War Stimson (left) and Under Secretary Patterson favor national service. Says Patterson: "It should not be possible for some to say, 'I do not choose to serve'"

WHY WE FACE A MANPOWER SQUEEZE

1. Total employment, including armed services, is already at a record peak of 57,433,000 (National Industrial Conference Board, January, 1943, estimate). This must be boosted to 65,000,000 by the end of 1943. Normal peacetime labor resources are already exhausted

2. Armed services must be increased by 3,400,000 to reach total of 11,000,000 by end of 1943, with inductions at rate of 12,000 a day

3. War industries must increase total working forces by about 2,000,000 while losing heavily to armed services but gaining from civilian industries (which will lose about 3,000,000)

4. Agriculture must pick up about 3,500,000 workers for summer months and maintain year-round working force of 8,900,000

How They Smoked Out the White House

However, this again would have to await some sign from the White House. Which makes it worth while to inquire further into the motivation of the Austin-Wadsworth Bill. Perhaps Representative Wadsworth can throw some light on an interesting bit of history.

"Congressman," FACTORY asked him, "what significance is there in the fact that you, outside the Administration as you are, have appeared as house sponsor of two important bills defining national policy on manpower —first, the Selective Service Act, which appeared to have so little chance at the time, and now the National Service Bill, which seems equally unlikely to pass at the moment?"

His reply is worth pondering.

"Well," he said, "Burke (the then-Sen. E. R. Burke of Nebraska who, although a Democrat, was as far outside the Administration as any Republican.—*Ed.*) and I felt there was a need for such a law, but that the White House would dodge it as a political issue. So we got together on it, primarily to smoke out the White House. This took 8 or 10 weeks, but we succeeded—and the law passed."

And that, considering the times,

AGAINST IT — Bernard M. Baruch (left) World War mobilizer, joins William Green (center), AFL chief, and Philip Murray (right) of CIO in opposing Austin-Wadsworth Bill. Baruch testified: "Enforced service for a private master has been repeatedly defined by our Supreme Court as slavery"

was a very good job of smoking out. For the opposition, inspired by vigorous isolationist groups, was ferocious. Some Congressmen got stacks of letters that assayed 97 to 1 against the Selective Service Bill. Yet the Bill, as Wadsworth reminds us, *did* pass.

Will the Shortage Speed the Decision?

It must be remembered, however, that events themselves took a powerful hand in smoking out the selective service issue. In that case it was events abroad, particularly the fall of France. Today one couldn't lay many bets on the political smoking-out potentialities of the Austin-Wadsworth Bill alone. But events—this time at home—may again turn the trick.

Chief of these events is the long-awaited "crucial" manpower shortage. This will not hit with equal impact throughout the nation, of course. But observers believe that it will fall soon and sharply on most of the 36 industrial communities which already have been labeled by WMC as labor shortage areas. There the three major "consumers" of manpower—industry, agriculture, and Selective Service—will have to compete furiously for the available manpower supply.

The scramble has actually begun. Selective Service stands face to face with the fact that it *must* begin taking fathers from non-essential activities or occupations—or else continue to raid industry and agriculture for men of lesser dependency status. WMC officials are frankly worried because the "work or fight" order on men in non-deferable occupations isn't working too well.

Local boards, sensitive to local pressure, hesitate to take fathers while any alternative exists. But they can't dodge the issue much longer and come anywhere close to meeting 1943's induction schedule. Yet the current tendency of local boards is to take a key worker from a war plant, if he's single, rather than a barber with four children. A clear tip-off is the fact that Selective Service State Directors are pleading with local boards to "play ball" with replacement schedules filed under the Manning Table Plan.

If the Bankhead Bill for "blanket" deferment of farmers should pass, so much the worse. And if the Kilday Bill for "blanket" deferment of fathers should pass, so much the worse, still. Both are given a good chance to pass. Either one is considered dead sure to be vetoed by the President to avert complete chaos.

At the very best, something will have to "give" when the real pinch comes in the labor shortage areas. And somebody—industry, agriculture, or the Army—will have to go begging so long as all three are competing for the local supply of employables within the existing labor force.

What then? WMC officials already foresee (when speaking off the record) that reserves will have to be rushed in from labor surplus areas, that manpower will have to be taken away from non-essential industries—and probably rationed to essential industries—and that battalions of city dwellers will have to be mobilized to work on the farms.

In other words, people will have to be moved about from place to place. And officials point out that it is precisely at this juncture that every other belligerent nation in the war has found compulsion necessary.

McNutt promised again on March 19 that he will strive to meet these problems by voluntary measures.

"But everyone, including McNutt, knows that we have long since passed the purely voluntary stage," one of his own aides observed. "His only hope of getting the job done is by a combination of voluntary methods with indirect compulsions, sanctions, and 'work or fight' tactics."

This may bring McNutt bang up

WMC Chairman McNutt (left) will strive to carry on without a labor draft law while Maj. Gen. L. B. Hershey (center) keeps up Selective Service quotas and Agriculture Secretary Wickard (right) does his best to raise a farm army of 3.5 million

against the obstacles which he himself predicted last October 21 when, commenting on indirect compulsion, he observed:

"So long as we operate under such a system, I foresee grave difficulties. When indirect sanctions are relied upon, any statement of the obligations of workers and employers cannot be concise and authoritative because it is merely a declaration of administrative intent rather than an expression of the will of the nation through practice."

A Declaration From the White House

McNutt's latest promise to carry on without a law was an echo of the first public announcement of White House policy on the problem. President Roosevelt, on March 19, told a press conference that he wanted to avoid a compulsory manpower law as long as possible. The main question, he said, was *when*, if ever, such legislation would be needed. He expressed hope that it might be avoided completely. These non-committal remarks were rendered confusing by variations in the press reports. But the consensus was: "No civilian draft till needed—F.D.R."

Austin-Wadsworth Bill supporters hailed this as the first sign of victory in their smoking-out campaign. They contend that the President's statement fell far short of outright opposition to manpower legislation. They contend that the President, by implication, gave recognition to the prospective need for such a law, and thus gave their Bill a push toward enactment. By way of confirmation, McNutt took one step further on March 22 and admitted that legislation is probably "inevitable."

That, admittedly, remains to be seen. Meanwhile, it must be granted that the Bill is worth the FACTORY reader's scrutiny, and that the arguments for and against it, now raging in Washington, deserve his attention.

Austin-Wadsworth Bill Provides These Things

The Austin-Wadsworth Bill would make clear the intent of Congress to authorize the mandatory mobilization of men and women for work in industry and agriculture. It provides for the registration of all women from 18 to 50. It empowers the President to issue calls for large numbers of volunteers for special forms of work. If,

within a given time, the number of volunteers proves insufficient, then the difference would be made up by persons drawn involuntarily through the Selective Service machinery on the usual quota basis.

The right of appeal from "undue hardship" is provided, seniority rights are guaranteed, and the government is committed to furnish suitable housing and transportation facilities, as well as vocational training to those who enlist or are drafted.

The Bill does not attempt to indicate specifically how the complexities of arranging for mass transferences of people would be arranged. Instead, there is a sort of omnibus clause authorizing the President, directly or through the Chairman of the War Manpower Commission, "to prescribe the necessary regulations to carry out in an impartial manner the provisions of this Act." The penalty for noncompliance is set at a maximum of six months' imprisonment, a fine of $1000, or both.

As an amendment, Austin added: "Provided further, that every person assigned to service under this Act, including every accepted volunteer, shall have the right to join any union or organization of employees, but no such person shall be obliged to join any such union or organization if he or she should not freely choose to."

Capt. Eddie Rickenbacker, hero of two wars, opposed labor draft in testimony on Austin-Wadsworth Bill. He urged, instead, a wider application of incentive system to boost output, curb absence in war plants

What Austin and Others Believe About the Bill

Now let us take the testimony—both *pro* and *con*—of those concerned with this Bill and with manpower legislation generally.

Pro—Senator Austin (in the following statement to management especially prepared for FACTORY): "One of the deficiencies in the maximum continuous production of war goods which our investigation brings out is a deficiency in management, in efficient supervision. This Bill contemplates educating for management. It provides aptitude tests, to be followed by a system of special intensive training which would step up not only manual skills, but the ability to manage as well.

"The Bill ought, further, to help management in fundamental ways relating to stability of attendance at work, and morale. It is a declaration of the individual's liability to serve the nation according to his full capacity. Morale in the factory and on the farm is bound to be strengthened by the knowledge that the recalcitrant worker may be punished for his disobedience or failure to perform according to his liability.

"This Bill is for the willing worker. The fact that punishment is possible for the recalcitrant makes the willing worker's position secure and certain. He knows exactly where he, or she, stands in relationship to all the rest of society."

Con—William Green, president of AFL: "Soften the provisions as you may, the Bill imposes involuntary servitude in violation of the Thirteenth Amendment to the Constitution and in violation of our most basic and cherished concepts of freedom."

Pro—Under Secretary of War, Robert P. Patterson: "This is not an issue between voluntarism and compulsion. In the steps that already have been taken in the so-called voluntary action, resort is had to compulsion. The attempt is made to freeze men in their jobs by blacklisting them from securing other jobs. The attempt is made to control hiring by depriving employers of the right to hire freely, and by exerting other indirect compulsions, and the indirect sanction of the Selective Service Act is used, thus putting it to a use for which it was never intended . . . There are vast areas in our manpower pool where there is no effective basis for organization either among employers or employees. The American people . . . require an assurance that everyone is being treated alike . . . It is all one war and all one war job. It should not be possible for some to say, 'I do not choose to serve.' "

Con—Bernard M. Baruch, World War head of the War Industries Board, reiterating before the Senate Military Affairs Committee the views he expressed to Congress in the World War: "We have heard a good deal of the slogan, 'Draft every dollar, every thing, and every man.' The attempt to draft labor is . . . impossible and dangerous . . . A soldier serves the nation directly. There is but one master in the case, and that master is America. He serves to profit no one but the country as a whole. Enforced service for a private master is and has been clearly and repeatedly defined by our Supreme Court as slavery."

Baruch heartily advocates expansion of the "work or fight" idea, the very thing which Wadsworth deplores most about indirect control. Wadsworth considers "work or fight" a perversion of the Selective Service system which he helped to create.

Pro—Grenville Clark, New York lawyer, who helped draft the Selective Service Act and who, as secretary-treasurer of the Citizens Committee for National War Service Act, had much to do with initiating the current Bill: "When you talk about indefinitely extending that principle (work or fight) consider for a moment what you would have to do. As to men, you would have to raise the military draft age to the present legal limit of 45 . . . while if you want to go further than that and extend it indefinitely, then Congress must legislate. Conceivably Congress could make the military age of men 65, and everybody up to 65 would be under a legal obligation for military service,

and they could be told unless they want to work at a certain place under certain terms that they could be put into uniform. If you want to reach women you would have to make women subject to a military obligation for service, and then you could hold the club over the women of the country. Does Congress want to go down that road?"

Con—Len De Caux, editor of the *CIO News*: "The Austin-Wadsworth National Service Bill . . . completely disregards the real issue and simply gives the government the power to draft workers and compel them to work as and where directed . . . What's the real answer? It is to plan and organize nationally the assignment of contracts, the allocation of materials, the distribution of manpower, the provision of housing, transportation, etc., under centralized direction. These proposals have been embodied in the Tolan-Kilgore-Pepper Bills before Congress. They represent the only sensible approach to mobilizing our economy for victory."

A War Department official of prominence puts it this way: "Six months ago I still believed that the normal processes of a free economy would bring the three elements of production—materials, facilities, and manpower—together when and where needed. Today I have changed my mind because in the meantime we have so interfered with normal economic forces—profits, wages, and materials—that we can no longer count completely on the free movement of workers to supply all manpower needs. I am still certain that in 95 percent of all cases a voluntary appeal will suffice, and that 4 out of 5 of the remainder will go willingly enough when they are told, and only one will ever have to be ordered. In England the number of persons who have had to be ordered, after full use of the voluntary method, has been a tiny minority. Indirect sanctions will do more harm than good."

What the Labor Draft Means to Management

What effect would National Service have on the current operations of industrial management? Opinions vary greatly. Wadsworth doubts that his own Bill would have any important direct effect on management since it would simply formalize policies that are already in process of development. This checks, to some extent, with the opinion of a top WMC official who contends that a principal weakness of the Austin-Wadsworth Bill is that it does not provide enough control over management. Others point out, however, that the Bill would authorize the chairman of the War Manpower Commission to write any regulations affecting management that he might choose—including rationing of manpower supply—without, in return, guaranteeing to management the supply of labor it may need to achieve production goals.

To the individual management man, however, the Bill's meaning is perfectly clear. It would, beyond doubt, hasten the compulsory allocation and movement of managerial, engineering, and technical personnel. This, although it does not appear in the Bill, is definitely in the minds of its sponsors. Let's ask Austin:

"Senator, does this bill contemplate the mandatory movement of management personnel from plant to plant or from private industry to government service — the conscription, if you please, of management?"

"Certainly," he replies. "There can be no discrimination among classes of workers. But we believe that, in general, management men will be more than eager to serve where most needed." This same line of thought is also in the minds of those on whom the administration of National Service would depend. However, most of them seem to regard a law as something that would simply expedite their current task of recruiting managerial, technical, engineering, and administrative personnel for various industrial and governmental jobs.

Does this mean that, with the enactment of National Service, vast machinery would spring into motion to manipulate management men from job to job like checkers on a board? No. There is apparently no blueprint for the sudden mass mobilization of management. The average management man, if he himself is satisfied that he is employed to his fullest skill in a war or essential job, can go to sleep each night with full confidence that he will awake to find himself in the same job the next morning.

"But it would help us to avoid some of the indirect compulsions we must sometimes employ in getting a key man for a key job," the government spokesman observed. "And I think that would be more satisfactory to everyone concerned."

Have any plans been made to adjust the serious hardship which the mandatory transfer of management men might occasionally entail? Apparently not.

"If an upper-bracket man were moved from one industry to another, he would presumably be compensated at about the same rate in either," the same spokesman said.

What, then, of the high-salaried executive who is transferred into government service?

"This unquestionably will result in some pronounced sacrifices. It has already. The highest paid individual in industry can't get more than $9000 a year with the government—nor should he expect to receive more than the commanders of our armed forces. Yet I agree that something will have to be done to ease the tax problems of some of the individuals who may be called upon to serve the government on a compulsory basis."

Labor Draft Called Only Solution in Sight

Does this seem vague? Then remember that the whole government is muddling along, not only with this, but also with every other aspect of the manpower problem. Democracies tend to wait for a crisis before evolving a solution. It is the prospect of a more or less immediate crisis which apparently has prompted the majority of FACTORY's sources to agree that a legislative solution will have to be found within a very short time.

"When the showdown comes we'll find some sort of solution," one of the keenest observers in Washington predicted. "We always do. The best thing we can hope for is that we will meet the problem with as much informality, voluntarism, and common sense as the British have done. Law or no law—and they have a law—that's their way, and it should be ours. I think we will have a law, but I don't think it will be the fearsome thing that is visualized in the debates of today, or that it will bring about the sweeping totalitarian changes in industry which most of us seem to be dreading now."

Significant Labor Developments

Period Surveyed: February 10 to March 10

TREND INDICATORS

WMC Administers Executive Order

WAR MANPOWER COMMISSIONER is authorized to establish a minimum workweek greater or less than 48 hours to take any other action with respect to any case or type of case in which he determines that such different minimum work week or other action would more effectively contribute to the war effort and promote the purposes of the Executive Order.

The release of workers caused by the increase in hours and their absorption in more essential employment is to be supervised by area manpower directors.

To render more effective the 48-hour week, established by Executive Order 9301, a Bureau of Manpower Utilization is being established in the War Manpower Commission, charged with enforcement of the order and with the development of plans for improving utilization of labor in war plants. Although great latitude is given to local authorities to institute methods of control best adapted to local conditions, industry itself should take inventory of its manpower to secure its most effective use in war production; this in an effort to conserve the nation's critically reduced manpower and properly allocate its limited supply among military, agricultural, and vital industrial needs.

Regional Directors are authorized not only to extend the boundaries of the Order's application where local manpower needs require, but to consider individual exemptions from the minimum work week requirements where a full 48-hour week will neither increase production, release workers for other employment, nor otherwise further the war effort.

Wage-Hour Reaches Local Operations

Numerous employees only indirectly connected with interstate commerce have now been brought under the Wage-Hour Law, imposing upon their employers liability for overtime payments.

This follows a recent ruling that production of goods for sale to the federal government brings the business into interstate commerce. (Timberlake vs. Day & Zimmerman.)

Even where the bulk of products were sold for local consumption and only certain byproducts sold to local firms for processing and ultimate shipment in interstate commerce, the labor on the products has been declared to be entitled to the protection of the Wage-Hour Act. (Sykes vs. Lochmann.)

The progression of events has generally favored the wide application of the Wage-Hour Law. From cases where pure interstate commerce was involved, the Wage-Hour Division and the courts have gradually brought local enterprises within the scope of the Act wherever some effect upon interstate commerce could be discerned.

Full compliance with the Wage-Hour regulation, and the avoidance of heavy penalties, requires accurate and complete records.

The accuracy and integrity with which such records are kept will be the difference between overlooking a slight infraction and imposition of the full penalties for violation of the Act.

The danger of irregular records was illustrated by a conviction under the Public Contracts (Walsh-Healey) Act, when a company was charged with deliberately concealing the employment of a homeworker from whom nearly $3000 in wages had been withheld.

Because the company violated not only the minimum and overtime wage requirements of the Walsh-Healey Act but also the provisions for record keeping, the blacklist penalty was invoked, which means no more government contracts. (Ideal Uniform Cap Manufacturers, Inc.)

Service Employees Not Under the Wage-Hour Act

A New York Court refused to grant service employees of office loft buildings the benefit of the Wage-Hour Law where only three out of the 57 tenants were engaged in interstate commerce. Though half of the remaining tenants, occupying more than 50 percent of the floor area, were engaged in interstate commerce, that factor was unimportant if they were not actually producing goods for interstate commerce. The Court ruled upon the test set forth by the U. S. Supreme Court in the Kirschbaum case.

For building service employees to be entitled to the benefits of the Wage-Hour Law, the tenants must be "principally" engaged in the production of goods for interstate commerce. (N. Y. Title & Mortgage Company.)

Contract Modified to Conform With Belo Doctrine

A Federal District Court authorized the reformation of an employment contract affecting the employees' right to recover back overtime compensation where there was a mutual mistake of law and fact. In the particular case the Court found that both parties intended at the time the contract was entered into that total payments were to cover overtime under the Act. (Adams vs. Dime Savings Bank.)

Employees Bound by Belo Plan

Employees who continued in their jobs under a Belo-type contract agreed to be bound thereby and had no authority to sue for additional pay under the Act. (Schepler vs. Crucible Fuel Company of America.)

The Division holds that an employer and his employees may by prior agreement establish a wage plan under which the employees will receive one rate of pay during the peak season and a higher rate during the slack season when fewer hours are worked. Even though in effect the plan would maintain a constant wage for the employees if the rates are specified in advance and are *bona fide*, the contract will be honored and the rates permitted to stand.

Computing Overtime

Amounts due for vacation pay may not be computed in determining overtime where this was not the practice of the company's competitor. (Shattuck Denn Mining Company.)

Now under Walsh-Healey as well as the Wage-Hour Act, employers may not offset payments to employees for holidays not worked or time lost through illness against overtime payments due under the applicable statute. (Rule of Wage-Hour Administrator.)

Computing Time

For purposes of computing time the Wage-Hour Division ruled that a

(*Continued on page* 132)

How New Britain War Plants Re

W. J. CASHMAN, Director of Public Relations, Landers, Frary, & Clark, New Britain, Conn.

ELEVEN WAR PLANTS in New Britain participated early this year in a campaign that, in 40 days' time, added 2341 housewives to their payrolls and thereby licked the manpower shortage.

The campaign revealed a gross potential pool of 22,377 women workers. After deducting the 6268 employed, a net potential pool of 16,109 women was left. Of these, 4000 were not available for employment. In addition, the campaign resulted in the discovery of 1429 women reserves available from March to July. These reserves included women with children two years old or over. Four hundred and thirty-two of these mothers will be available at a later date; 635 are currently available and on the active list; 362 indicated availability if their children were cared for in child centers.

This startling response of housewives to the appeal of New Britain industry — which includes such well-known manufacturing institutions as Landers, Frary, & Clark, New Britain Machine, Fafnir Bearing, Corbin

To dramatize New Britain WIPS (women in production service), the participating companies set up machines and equipment in "talking windows" where women workers did their every-day jobs under the spotlight. Loudspeakers enabled them to describe their work and its importance in the war effort

Recruited Women Workers

Yes, YOU can help!
New Britain NEEDS
WOMEN
War Workers
Register Today
Apply to Industrial Division Chamber of Commerce
HOW YOU CAN HELP WIN THE WAR
NEW BRITAIN
Industry needs
Men and Women!
MOTHERS
While you work your children can be taken care of
Do you know about the child day care center?
Located at the Camp School under the supervision of trained women is a nursery school where you can leave your child in good care from 6:30 A.M.—6:00 P.M. This is for children from two years old to kindergarten. They will like it—games, good
The cost per week is small.

Billboards shouted the story of women wanted. Newspaper ads kept driving the message home. And every family in town got a folder that gave full details — where to go, whom to see, what to do with children, how to convince a husband

Screw, Corbin Cabinet Lock, P & F Corbin, North & Judd, Russell & Erwin, Skinner Chuck, Stanley Tools, Stanley Works, Tuttle & Bailey, and Union Manufacturing Company—is today highlighting the way for other areas faced with the shortage of labor. It is estimated that the campaign has added 6,000,000 man-hours annually to New Britain's productive capacity.

The campaign's technique was simple and eminently sound. It was based on two principles:

1. With the pool of male workers exhausted and a lack of housing facilities preventing further in-migration of war workers, emphasis must be placed on the voluntary enlistment of local women to fill manpower gaps.

2. If you want to sell war work to women, it must be done in the same way that you would conduct a campaign to sell a nationally advertised product, such as a refrigerator or a washing machine.

Such merchandising technique requires thorough market analysis, adequate market conditioning, and forceful salesmanship. In the New Britain plan, each phase of this merchandising technique plays an important part

Above, a recruiter interviews a good prospect. Recruiters were chosen from participating plants and trained in sales techniques

Right, two housewives working on an important item of war equipment are typical of the 2341 who "joined up" during the drive

right up to the final house-to-house recruiting of workers.

The first step in setting up the plan was to organize a War Manpower Committee. It was composed of the personnel and advertising representatives of thirteen New Britain war plants, and representatives of the Chamber of Commerce, U. S. Employment Service, Manufacturers' Association, and the New Britain Defense Council.

Arrangements for the campaign speedily got under way. A community survey provided important factual data, indicating the problems to be solved before widespread employment of women could take place. These problems were tackled at once. Thus, for example, it seemed pertinent to expand child-care facilities, not only because they were needed, but also because of the publicity effect such a move would have.

A Child Care Center was then established, with adequate facilities and a competent staff for the care of children aged 2 to 5. Money for the center was provided from community chest funds until Lanham Act appropriations could be secured. A hot lunch program for school children was set up, with supervision provided for before- and after-school periods. This program is now in process of expansion.

A clear-cut decision from the local draft boards was obtained in order to clear up the muddled opinion among women as to the draft status of husbands of women who showed the ability to support themselves by entering industry. Once secured, this decision was widely publicized through news releases and advertising; and arrangements were made so that any New Britain woman confronted with the problem could get the draft status of her husband by calling his local board.

Transportation difficulties were ironed out with the proper officials. Support of the clergy was secured through a series of meetings and by eliminating conditions to which they objected. Methods were developed to secure the complete cooperation of participating war plants regarding a more uniform hiring practice. Other local problems were simultaneously tackled.

Concurrently, while the committee and civic groups were providing solutions to some of the problems, a publicity program was developing. This program employed large-space newspaper advertising, scheduled at the rate of three advertisements per week for a 10-week period, or 30 in all. The advertisements used dominant illustrations and patriotic copy, stressing the need, together with testimonial tie-ins of local women in industry who

(*Continued on page* 140)

Supervisory Problems—No. 2

WHAT WOULD YOU DO IN A CASE LIKE THIS?

Second in a series. Used at Carnegie-Illinois Steel Corporation, Pittsburgh, to stimulate discussion in foreman training classes. Developed by R. J. Greenly and E. B. Mapel, Industrial Relations Division

Bill is foreman in a machine shop. For ten years his crew had been known among the employees as a good one to work with, because Bill had earned the good will and respect of his men through considerate and helpful supervision. His men had greater freedom and privilege than other men in the plant, but they rarely abused these privileges. One of the privileges was that the men could "knock off" and go to the canteen for a cup of coffee or a soft drink whenever they wished. This had not interfered with the efficiency of the shop, and Bill's men had been meeting the production schedule easily.

Because of changes in the shop, Bill lost most of his old men and got a number of employees from other departments. During the next few months his disciplinary problems increased tremendously. One man had to be discharged for insubordination, while others repeatedly were found loafing, making careless mistakes, and indulging in horseplay. Production in Bill's shop dropped behind schedule even though the new men were highly skilled and able to do the work. Soon Bill found it necessary to report some of the men for violations of plant rules.

After a month or so Bill's superintendent told him that he should cut down on the number of violation reports because it looked bad in comparison with other departments. He also told Bill that he should keep his men out of the canteen during working hours because some of them were reported to have walked through other departments taunting the men for their lack of special privilege. Later the older men came to Bill in a group and protested the loss of their so-called "rights," stating that their work was just as good as it had ever been. Then some of the new men went "over Bill's head" to the superintendent with a charge that Bill was making violation reports on new men for leaving their jobs to go to the canteen while he did not report the older men for doing the same thing.

The following statements apply to this situation. Study each one carefully. If you agree, put a circle, around the "T" following the statement. If you do NOT agree, circle the "F". If you are in doubt, circle the "??".

1.	Bill should not have allowed his older men to get into the habit of making frequent trips to the canteen.	T	?	?	F
2.	Bill probably could not have been as successful with the older men without allowing special privileges.	T	?	?	F
3.	When one group of employees has a privilege not granted to others, it tends to create dissatisfaction throughout the plant.	T	?	?	F
4.	As a foreman, it was Bill's right to allow the older men to continue their special privilege while forbidding the new men to do likewise.	T	?	?	F
5.	The same privilege should be extended to all employees in the plant.	T	?	?	F
6.	Bill's superintendent should not have told him to cut down on the number of violation reports.	T	?	?	F
7.	A large number of violation reports always indicates that the foreman is losing control over his men.	T	?	?	F
8.	Violation reports should be given in all cases when rules are violated, even though the foreman believes the act to be harmless and committed without malice.	T	?	?	F
9.	There should be a uniform system requiring the reporting of all rule violations so the foreman will not be responsible for deciding whether or not a violation should be reported.	T	?	?	F
10.	A foreman should not be required to report rule violations which do not interfere directly with production.	T	?	?	F
11.	Bill could have solved his discipline problem by verbally reprimanding the new men who were not cooperative.	T	?	?	F
12.	Bill should have held a group meeting with his men to explain that they would have to be more considerate in order to retain their special privilege.	T	?	?	F
13.	As soon as the trouble began, the foreman should have asked each of his older men to give friendly counsel to the newer men regarding the proper use of the privileges.	T			F
14.	A foreman should never ask a non-supervisory employee to assist in reprimanding a fellow employee.	T	?	?	F
15.	Bill's superintendent should have recognized the potential danger of the special privilege which had been given to the older men, and he should have stopped the practice before the men became accustomed to it.	T	?	?	F
16.	A foreman should always recommend the same penalty when a given rule is violated.	T	?	?	F
17.	To the men who caused trouble, Bill should have given penalties heavy enough to prevent any further rule violation.	T	?	?	F
18.	Once an employee has been given a special privilege it is almost impossible to take it away.	T	?	?.	F
19.	Bill should be replaced since he has lost the respect of his men and is probably incapable of handling the situation.	T	?	?	F

MANAGEMENT SHORTS

Readers are invited to contribute brief articles, illustrated when possible, reporting out-of-the-ordinary management accomplishments. Accepted articles will be paid for

Safety Campaign Cuts Eye Injuries

Safety engineers at North American Aviation began an extensive campaign to reduce the number of eye accidents among employees in the plant in August, 1941. Thirty-three percent of all employee accidents had been eye injuries.

The safety campaign started with an inventory of all eye-protective equipment on hand. The survey showed 889 pairs of goggles and 483 face shields in the various tool cribs in the plant.

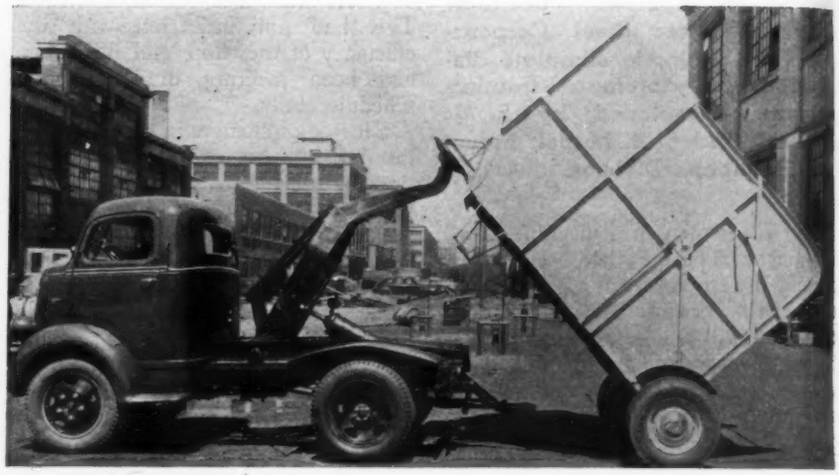
A large additional amount of protective equipment was secured. By August, 1942, there were 9016 pairs of glasses, and 4911 face shields—13,927 pieces of protective equipment—available in the plant.

Each machinist who was in danger of sustaining an eye injury from the equipment he used, was instructed to use an eye shield on the job. Shop foremen and supervisors were made responsible for seeing that employees in their departments wore this equipment.

Machines in the plant which threw bits of metal, or otherwise were considered a hazard for eyes, were equipped with special shields. Air conditioning equipment was installed in sections where airborne particles had been causing eye discomfort and injury.

The campaign had a very definite effect. In August, 1942, eye accidents and injuries had dropped from 33 percent to 14.7 percent of the total of all medical cases treated at the plant hospital.

Flying dust and fragments can't harm this workers' shielded eyes and face



In this view the rubbish container has been tilted to a 45-deg. angle by the tractor's hydraulic hoist. The operator can dump the contents easily

Mobile Containers for Rubbish Disposal

E. J. KIDDER, General Foreman, Transportation Section, General Electric Company, Schenectady, N. Y.

Mobile containers of special design have done much to simplify the problem of rubbish removal. These containers are spotted at selected locations by a tractor. When loaded they are hauled to the disposal station. There the combination of a hydraulic hoist on the tractor and a counterbalanced door on the container permits the operator to dump the contents easily.

It is estimated that two men, two tractors, and 35 containers will replace 20 men and 10 trucks, at an annual saving of approximately $25,000.

•

Check-Up On Noxious Solvents, Substances

Shortage of the usual materials used in the manufacture of rubber has brought into use many synthetics, production of which calls for numerous solvents and substances that are comparatively new to the industry.

Because constant check is necessary to be certain all such substances are not hazardous to the employees' health, the

(*Continued on page* 148)

MAINTENANCE SERVICES

The well-maintained plant is the high-production plant

SELECTION • INSTALLATION • INSPECTION • UPKEEP • ORGANIZATION

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CHANGE OF ADDRESS

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd Street, New York, N. Y.

Director of Circulation:
Change my address on Factory Management and Maintenance

From .....

.....

To .....

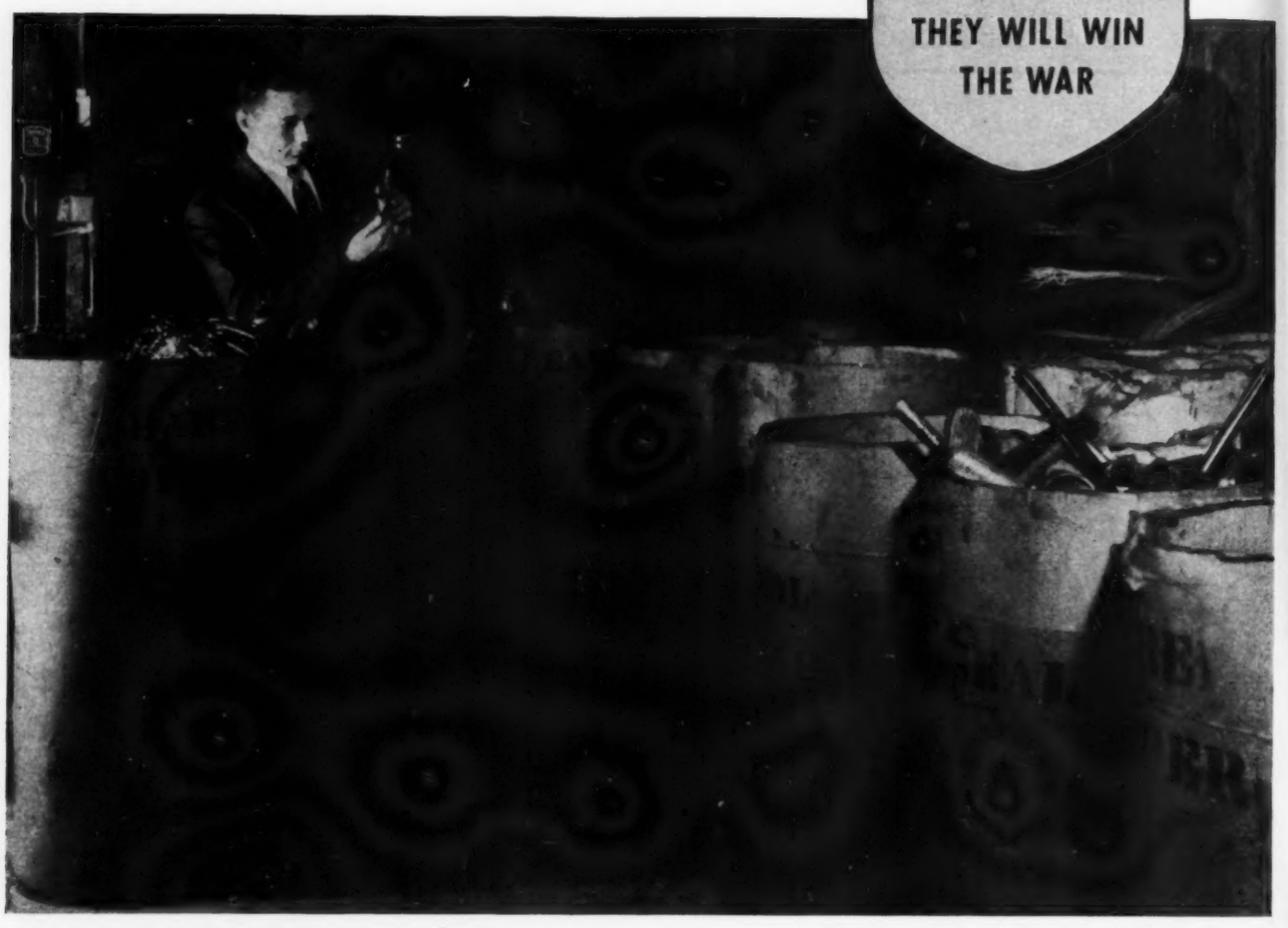
.....

Signed .....

FACTORY MANAGEMENT AND MAINTENANCE
McGRAW-HILL PUBLISHING COMPANY, INC., 330 WEST 42d STREET, NEW YORK, N. Y.

Salvaging Insulation From Wire and Cable

A. C. MATHEWS, Salvage Manager
The Okonite Company, Passaic, N. J.



Author A. C. Mathews makes sure that scrap is properly segregated and classified. His first job at Okonite involved material testing—then, when war broke out and salvage became of utmost importance, his knowledge of materials led to his being put in charge of all plant conservation and salvage

THERE ARE THREE METHODS of removing the insulation from electrical wire and cables. These methods are: (1) By squeezing and rupturing, (2) by slitting, and (3) by using a power-driven saw.

In determining the methods best suited to salvage insulation from conductors a serious question was what devices could be built or improvised that would be simple to operate and, at the same time, do the job quickly and economically.

Material saved, rather than cost, is the governing factor in this present emergency. Even though we manufacture cables we don't have enormous amounts of scrap. What we do have is many odds and ends of insulated wire, which require the use of not one but several methods for recovering the insulation as well as the copper.

Great interest has been shown by industrial concerns in methods of salvaging rubber from insulated wire and cable. This statement is based on the numerous requests for such information. We do not build or sell salvaging equipment. On the other hand, we have had considerable experience in this work and are glad to pass along what we know about it to other companies that can salvage insulated wire and cable for the rubber and other materials which are rapidly becoming irreplaceable and are needed now for the implements of war.

The losses by burning the insulation off wire and cable scrap in the old, familiar way, merely to salvage the copper, are heavy. There is the loss of rubber and synthetic materials; also the loss of copper due to oxidation, plus a considerable difference in the value of burnt copper compared with first-quality scrap.

Figure 1 (above). Rubber can be removed at the rate of 60 feet a minute by passing wire through rolls. The insulation comes off in two strands, as shown

Figure 2 (right). Rubber or synthetic sheaths are removed from cable by slitting. Single or opposed blades are held in a metal block, and cable is fed through

After studying the problem, we worked out these three methods of removing the insulation from scrap conductors:

1. *By squeezing and rupturing.* Everyone has at one time or another taken a piece of rubber insulated wire, hit it with a hammer, and found that the rubber would split or rupture, thus making the insulation easy to remove from the conductor. This same principle can be put to practical use in stripping rubber from scrapped insulated wire.

Look around the plant and see what equipment you have that can be converted into a salvaging machine by the addition of suitable power-driven rolls or wheels that will rupture the insulation when the scrap wire is passed between them. As Figure 1 shows, we did just that by adapting rolls for use on the same machine we employ for insulating wire by the strip process.

Some Removed by Hand

When salvaging scrap rubber-insulated wire, both plain and fabric-covered, ranging in size up to ½-in. outside diameter, we first remove a few inches of the insulation by hand with a knife, or pound it with a hammer, to permit the end of the wire to pass through the revolving steel rolls or wheels that squeeze the insulation against the conductor and rupture it. The rubber is then easily removed from the conductor. Pressure exerted by the rolls varies with the kind and thickness of the insulation to be stripped. The space between the rolls must be adjustable so that, regardless of the size of wire, the

insulation can be crushed against the conductor. Our experience shows this is the most economical method of stripping insulation. It can be used for rubber or synthetic-insulated wire, manufactured either with or without fabric coverings.

Practically the same results can be obtained by running the wire through almost any mill or calender rolls that have sufficient pressure to rupture the insulation.* One industrial plant has adapted a rod straightening machine to do this job.

The accompanying table shows typical results obtained by stripping insulation from wire by crushing.

Time Required to Strip and Material Reclaimed From One Lot of Scrapped Wire

Item	No. 12 stranded copper wire with 5/64-in. rubber insulation	2080 ft.
Time	For stripping insulation	34 min.
Material Saved	Weight of rubber after stripping	90 lb.
	Weight of copper wire after stripping	58 lb.
Value of Scrap	No. 1 Quality bare copper	9¾¢ per lb.*
	No. 2 Quality coated copper	8¾¢ per lb.*
	No. 3 Quality burnt copper	7¾¢ per lb.*
	Scrap rubber (mixed)	1¼¢ per lb.*

*Current local prices.

2. *By slitting.* For this purpose a single blade or opposed blades held firmly in a metal block or die may be used. This method, shown in Figure 2, has been found to be satisfactory for removing rubber or synthetic sheaths, jackets, or coverings on wire or cable having an outside diameter of ½ inch or more.

The device we use has a cutting blade inserted between a slit metal block or die with a hole in the center through which the cable passes. The hole in the block or die must be a little larger than the cable diameter to allow free passage for the cable, and easier cutting. Cables with thermoplastic synthetic sheaths, such as on Navy-type cable, and even cable with metallic braids, such as shipboard and shielded cable, can be easily salvaged in this manner. Set the blade or blades in the device just deep enough to cut through the insulation, and clamp tightly. Old hacksaw blades sharpened at one end can be used.

It is desirable to have the blade adjustable.

There are a few commercial devices of this general type on the market, but home-made tools can do an adequate job.

* "Bending Roll Used to Salvage Rubber," Factory, Nov., 1942, page 142.

Figure 3. For large cable and cable with metallic coverings a portable power-driven saw proves itself a useful salvage tool

3. *By using a power-driven saw.* This method is used for large cable and cable with metallic coverings. Where short lengths of lead-sheathed, and metallic-armored cable are to be salvaged, we have found that a portable power saw can do the job adequately and without danger to the operator. Simply place the cable in a grooved holding device, made of either wood or metal, and run the saw longitudinally along the cable, as Figure 3 shows.

Do not use a portable saw when removing lead or metallic sheaths from very short pieces of scrap cable, such as butt or sample ends. Instead pass the cable lengthwise over the revolving blade of a regular adjustable circular saw, which should have safety guides to prevent injury.

Another variation of this method, when removing lead sheaths from small pieces of cable, involves the use of a splicer's chipping knife, which can be made in the plant's machine shop. As shown in Figure 4, the knife edge is placed on the cable and the back of the blade is struck

with a hammer. The blade of course, must be heavy and strong. After the sheath has been removed, insulation can be stripped from the conductors as described previously.

It will be in order to suggest here that it is not always necessary or advisable to scrap short lengths of insulated wire and cable. New wire is difficult to get. In many instances wires can be spliced, reinsulated with splicing tape over the joint, and put into service on some non-critical circuit or used for temporary connections. Utilize your wire and cable to the nation's best advantage.

It must not be forgotten that proper handling of scrap, particularly insulating materials, is highly important.

Segregate and classify all scrap at the source. Avoid contamination; keep the scrap clean so it can be handled quicker and reclaimed faster. Greater profits will be yours if this precaution is properly observed, because scrap dealers always pay more for segregated material.

Separate Containers

Label plainly all drums, cartons, bins, or other containers in which scrap is to be placed. Take care to have scrap packed in suitable containers, or baled, as the case may be, so that when the scrap dealer arrives to take it away the minimum of time will be required to load his truck. He will benefit in the same way when unloading the scrap at his disposal place. Ease of handling will help also to speed the return trip of his truck for another pick-up.

Sell salvaged rubber and other scrap only to a licensed dealer. He will hasten delivery of the scrap to the mill and the reclaiming plant.

Before insulating materials can be properly segregated they must be correctly identified. This means that workmen in the salvage department must be given some training and instruction.

Many kinds of rubber as well as some of the newer synthetic materials are used to insulate electrical wires and cables. Some of these insulating materials are comparatively easy to identify by simple tests; others are more difficult to distinguish with any certainty by such methods.

Rubber compounds are usually quite elastic, dark in color, and when ignited burn readily with a characteristic odor. Neoprene, a rubber-like synthetic used on cords and also as a sheath for regular building-type wire, is also quite elastic, but it does not smell like rubber. It will not swell badly in oil as does most rubber, nor does it readily support combustion.

Figure 4. Removing lead sheaths from cable. Blade of splicer's chipping knife is placed on the cable while back is struck with a hammer. When sheath is off, insulation can be stripped from conductors

Koroseal and Vinylite, used on some Navy-type cables and for certain building-type wires, are leather-like in texture with a smooth surface. They do not burn, but melt or flow, giving off a characteristic chlorine odor.

There are many other insulations less easy to identify—as well as some, such as asbestos, paper, cotton, and varnished cambric that have no salvage value.

Since it is always desirable to know just what salvage value a material may have and where it can be sold, it is best to be certain of its make-up. With wire insulations, such rule-of-thumb tests as suggested previously are not always reliable. When in doubt, send a small sample of the complete wire to the original supplier or show it to your wire and cable manufacturer's representative. He may be able to identify quickly the type of insulation and advise whether it is worth salvaging.

It may seem bothersome to go to this trouble, but it probably will not be necessary to do it very often. When you do, it should be because of your genuine desire to save some appreciable quantity of scrap that can be reprocessed and used again to help relieve the critical shortages of materials needed for war purposes.

A knowledge of the basic methods suggested here, coupled with some good old American ingenuity and improvised tools, will enable any plant to do a good job of salvaging these scarce materials.

MAINTENANCE SHORTS

Readers are invited to contribute brief articles, illustrated when possible, reporting out-of-the-ordinary maintenance accomplishments. Accepted articles will be paid for

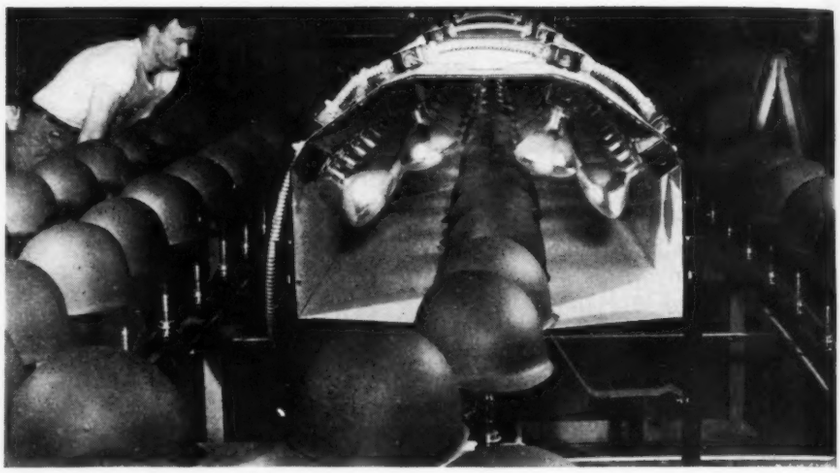
Army Helmets Dried by Infra-Red Lamps

SOURCE—Westinghouse Electric and Manufacturing Co., East Pittsburgh

Infra-red drying of freshly painted Micarta helmets for the army has speeded the process about 1000 percent and has reduced the dryer installation cost from $2500 to $600. In addition, the drying does not embrittle the laminated Micarta.

Drying by oven would have required a tunnel-shaped unit 225 feet long. Drying time was estimated at 15 minutes. The infra-red dryer installed is 19 feet long and dries the helmets in 95 seconds.

Helmets are painted on a conveyor that passes through the dryer at 12 feet per minute. Spaced 15 inches apart, 500 hats are dried every hour. To obtain even drying at 240 degrees Fahrenheit, hats are rotated slowly on spindles as they move along under four rows of 250-watt infra-red lamps with built-in reflectors. The rows, 8½ inches apart, are under an arc-shaped hood of such curvature that the lamps are 4½ inches from the helmets, with the rays at right angles to the painted surface. After the helmets leave the dryer, they continue on the conveyor for 7 minutes, are inspected, and then packed for shipment.



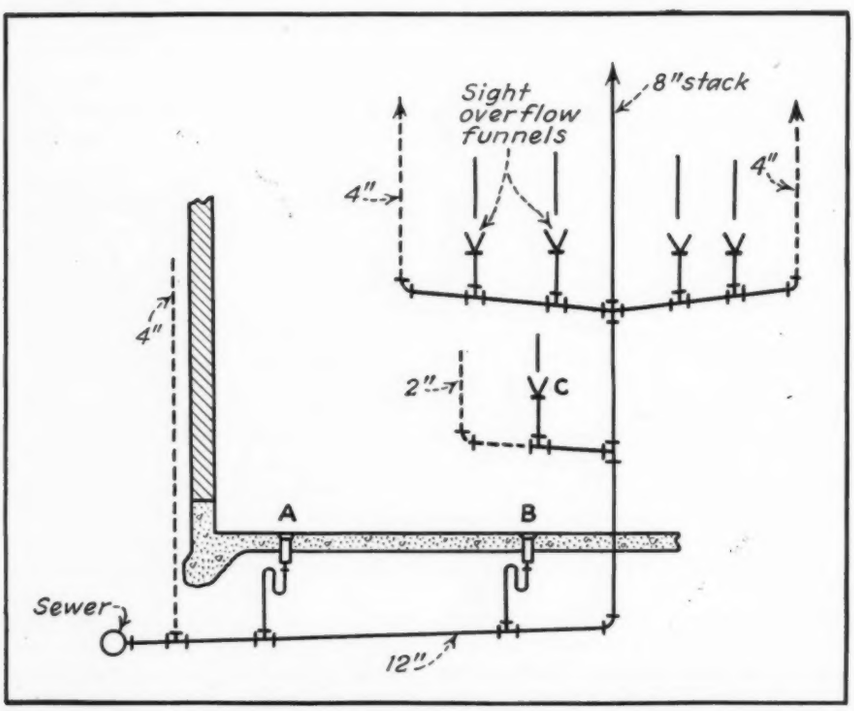
Paint on laminated Micarta helmets for soldiers is dried in 95 seconds as the helmets travel through a 19-ft. tunnel furnished with infra-red lamps

Venting Pipe System Prevents Overflows

S. H. SLEMAN, New York

Where waste liquid is discharged openly from tail pipes into funnels connected to the main waste disposal piping system, large amounts of air are picked up by the aspirating action of the waste water or other liquid falling into the funnel. Very often this action causes air binding which in turn reduces the normal capacity of the drainage piping and causes overflowing of floor drains and other low level inlets.

One large chemical plant, having trouble of this kind with its drainage system, supplemented the original venting layout with large-diameter vents positioned as shown in the accompanying illustration at the left. By so doing they were able to eliminate overflows at *A*, *B*, and *C*, and increase drainage capacity.



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Records of Tire Usage Keep Trucks Rolling

A. A. KUEHN, Transportation Supt., Seabrook Farms, Bridgeton, N. J.

Maintaining a fleet of trucks on an uninterrupted service basis, despite the tire shortage and increased use due to production speed-up, means truck tires cannot be misused. Giving each driver detailed instructions on how to "handle" his truck in order to eliminate unnecessary wear and tear has had good results.

Determining which drivers habitually stopped suddenly, started with spinning wheels, speeded, cut corners at high speeds, or failed to inflate tires regularly was accomplished by establishing a tire-use record on a plan more detailed than any previously attempted.

By using 8x5-in. cards on which are

(*Continued on page 86*)

LUBRICATION COLOR GU

FROM CONTAINER TO BEARIN

G. F. KEELEY, Lubricating Engineer, Beech Aircraft Corporation, Wichita, Kan.*

Instructions: All refinery-sealed barrels, steel kegs, and other containers shall be identified by a decalcomania transfer color prior to being placed in service. This color, or combination of colors, shall correspond with that shown on the accompanying color chart. (Note that trade names of lubricants actually used at Beech and Boeing have been changed to Alpha, Beta, etc. The reader will substitute the names of the lubricants used in his plant.—*Editor.*)

All portable containers used to convey lubricants from the original drums or packages to other sections of the factory shall bear the same color-code identification as the barrel or other original container from which they are filled.

All dispensing guns, cans, buckets, pails, and measures shall carry color-code decals of the same color or color combinations as the portable or original container from which they are filled.

Lubrication points on all machinery and equipment, including reservoirs; hydraulic systems; soft oil holes; pressure grease fittings; slides and ways; and miscellaneous fittings shall bear an identifying lubrication color-code decal, and shall be filled and serviced with a dispensing unit t
with a decal of the sa

To apply decalcoma

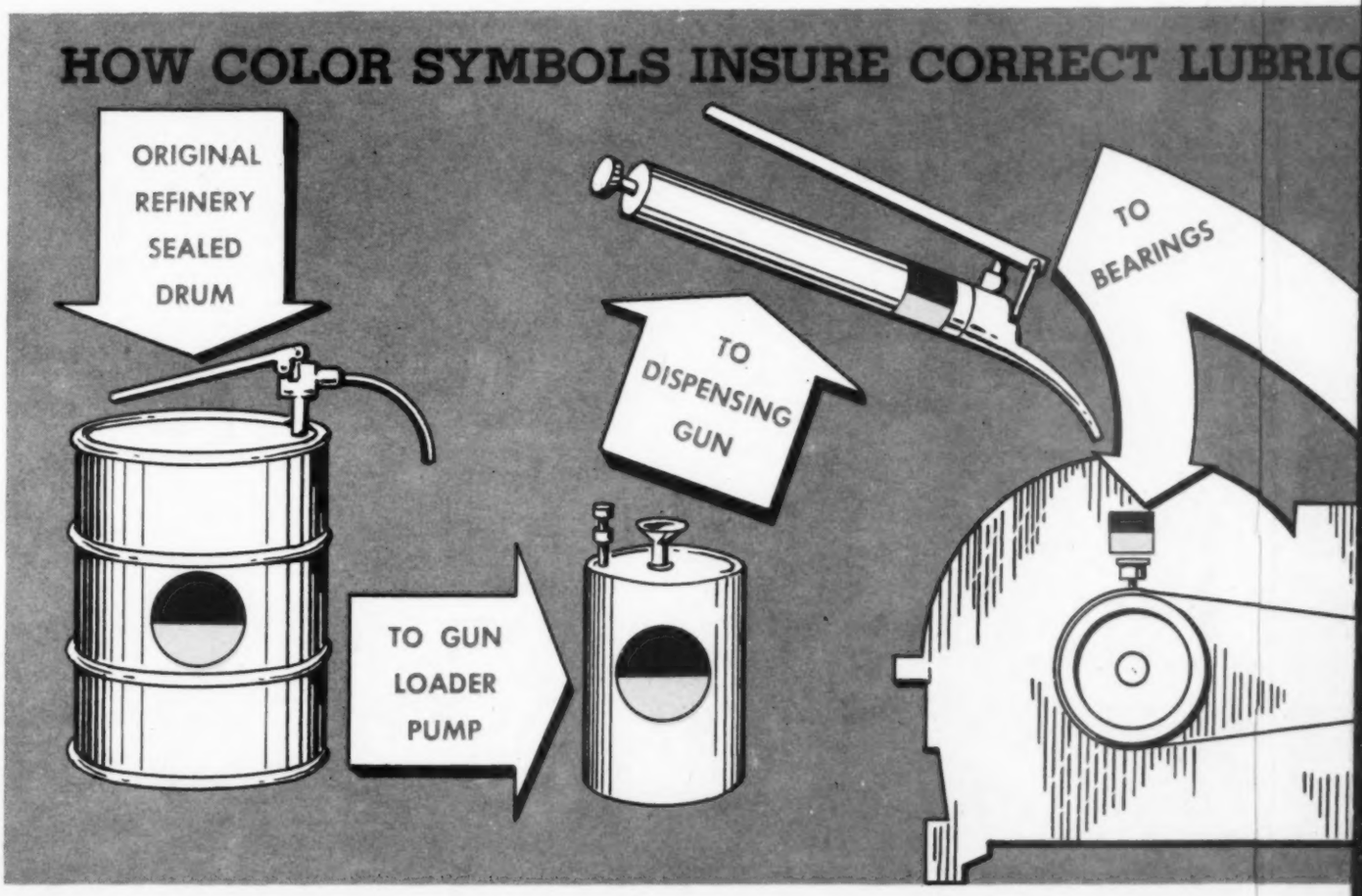
1. Wipe the area – c
to be mounted – free c

2. Give the cleansed
white shellac and let it

3. Submerge the dec
warm water for just a m
from the paper backin
jacent to the lubricati
ignated, and smooth o

4. Wipe dry; apply

*This lubrication color guide is also in use at Boeing Airplane Company, Wichita



PUBLISHED AS PA

OR GUIDE

BEARING

n, Wichita, Kan.*

with a dispensing unit that has been marked with a decal of the same color.

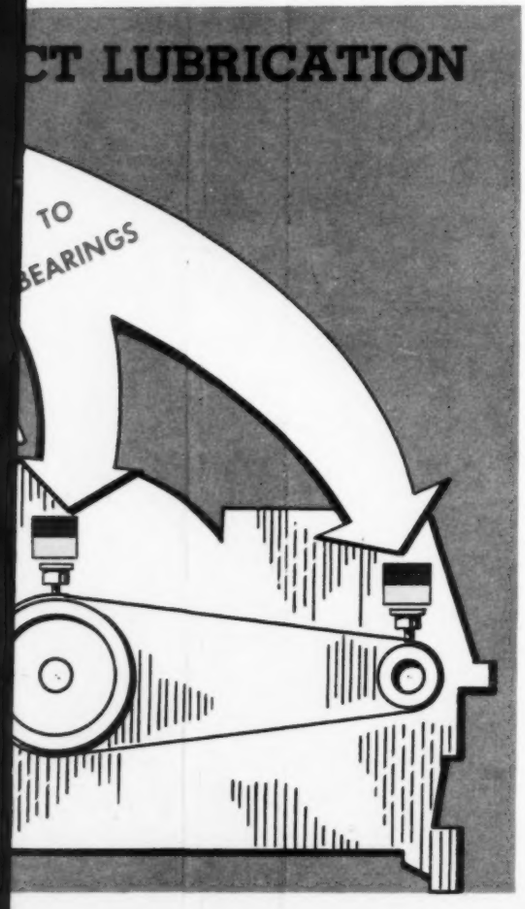
To apply decalcomanias:

1. Wipe the area – on which the decal is to be mounted – free of oil and dirt.

2. Give the cleansed area a light coat of white shellac and let it dry.

3. Submerge the decals in a pail of lukewarm water for just a minute. Slide the decal from the paper backing to the location adjacent to the lubrication point being designated, and smooth out air bubbles.

4. Wipe dry; apply light coat of shellac.



ALPHA OIL
Light

ALPHA OIL
Med

ALPHA OIL
Hvy

BETA OIL
Hvy

BETA OIL
Ex-Hvy

BETA OIL
"A"

GAMMA OIL
No. 3

DELTA GREASE
Light

DELTA GREASE
Med

ETA OIL
600-W

THETA GEAR
OIL

KA
SAE 10, 2

SHAPE OF SYMBOL

DAILY

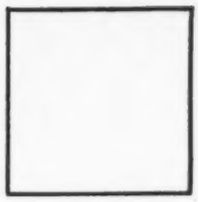
WEEKLY

PUBLISHED AS PART OF THE APRIL, 1943, ISSUE OF FACTORY MANAGEMENT AND MAINTEN

HA OIL
Hvy

ALPHA OIL
Ex-Hvy

BETA OIL
Light



BETA OIL
Med

BETA OIL
Hvy-Med

A OIL
"A"

BETA OIL
"B"

BETA OIL
"C"

GAMMA OIL
No. 1

GAMMA OIL
No. 2

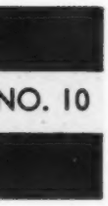
GREASE
Med

DELTA GREASE
Hvy

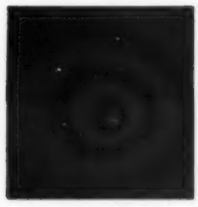
EPSILON OIL
"A"

RHO OIL
Hvy

ZETA OIL
"B"



KAPPA OILS
SAE 10, 20, 30, 40, 50, 60



IOTA GREASE
No. 2

WATER PUMP
LUBRICANT

SIGMA OIL
Hvy

MBOL INDICATES LUBRICATION INTERVALS

MONTHLY

SIX MONTHS

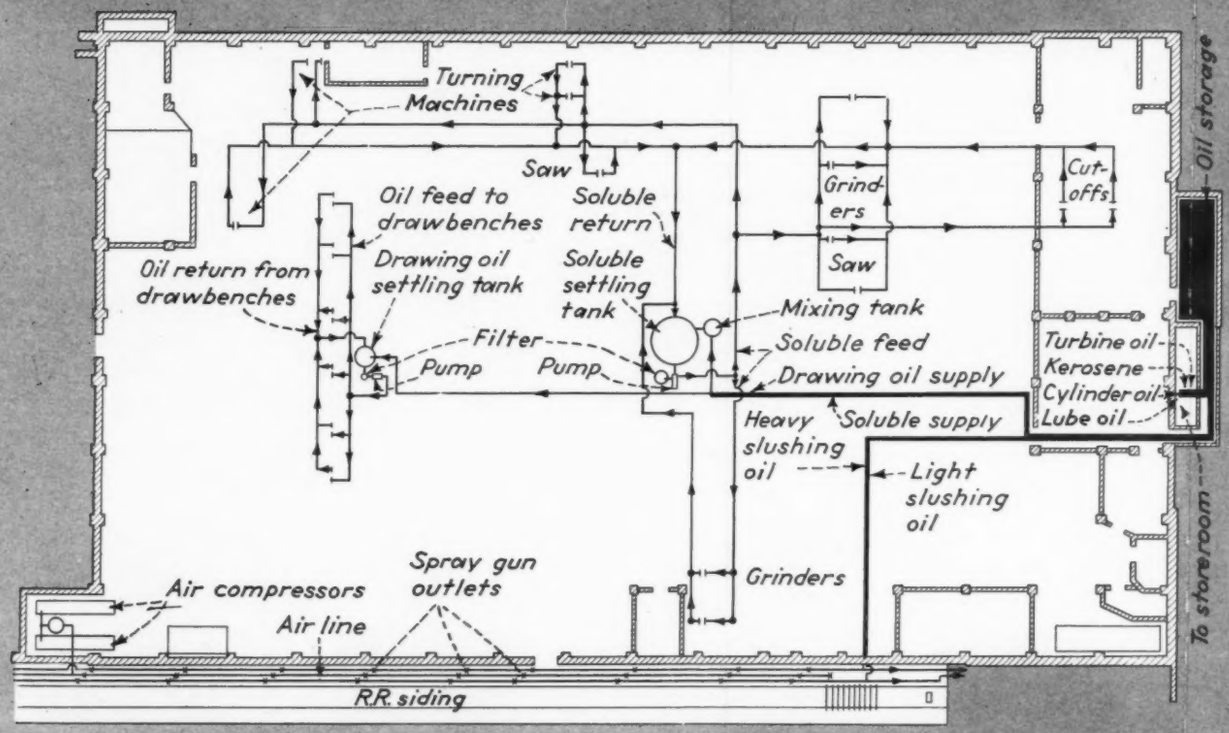
YEARLY

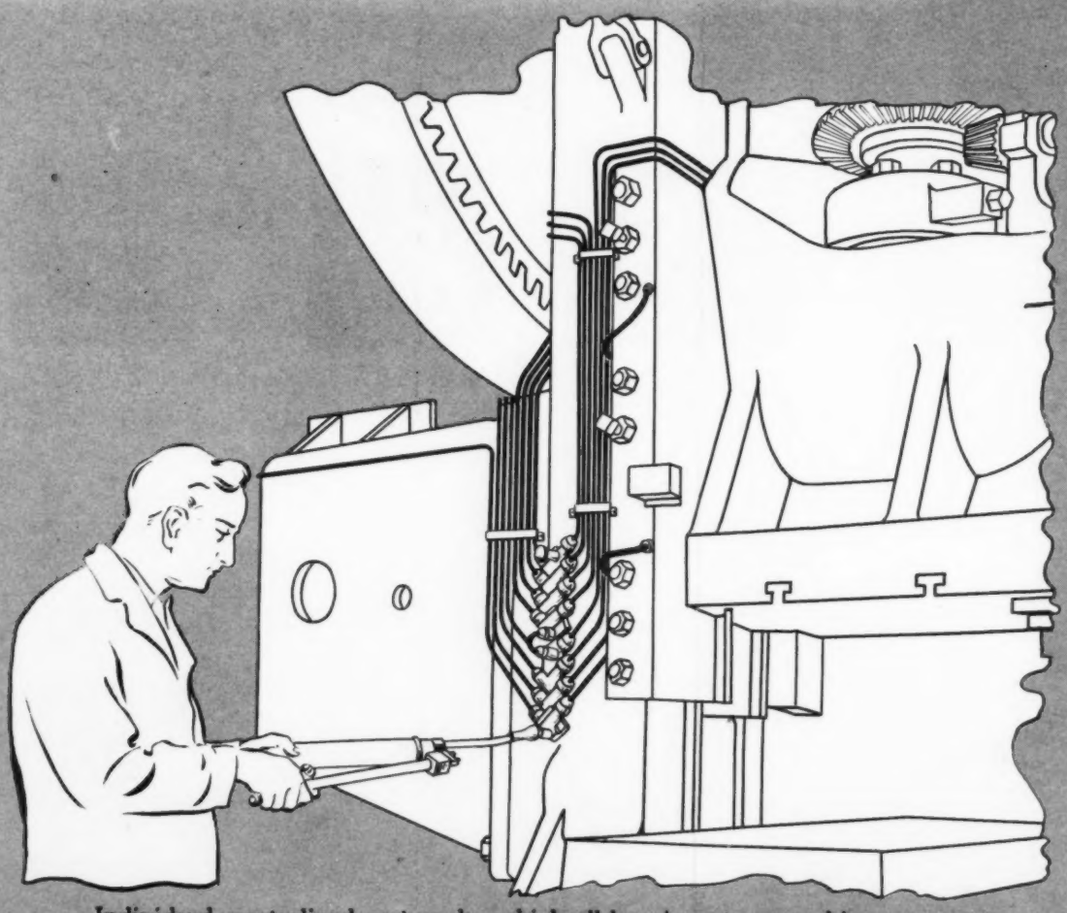
(Copyright November, 1942)

MAINTENANCE

HOW TO GET THE LUBRIC

Prepared by G. A. VAN BRUNT,





Individual, centralized system, by which all bearings on a machine are grease-lubricated from one spot. (Illustration courtesy of Alemite)

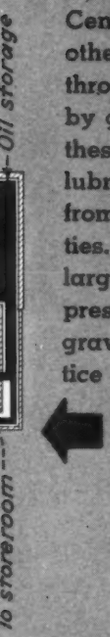
A cen
bearin

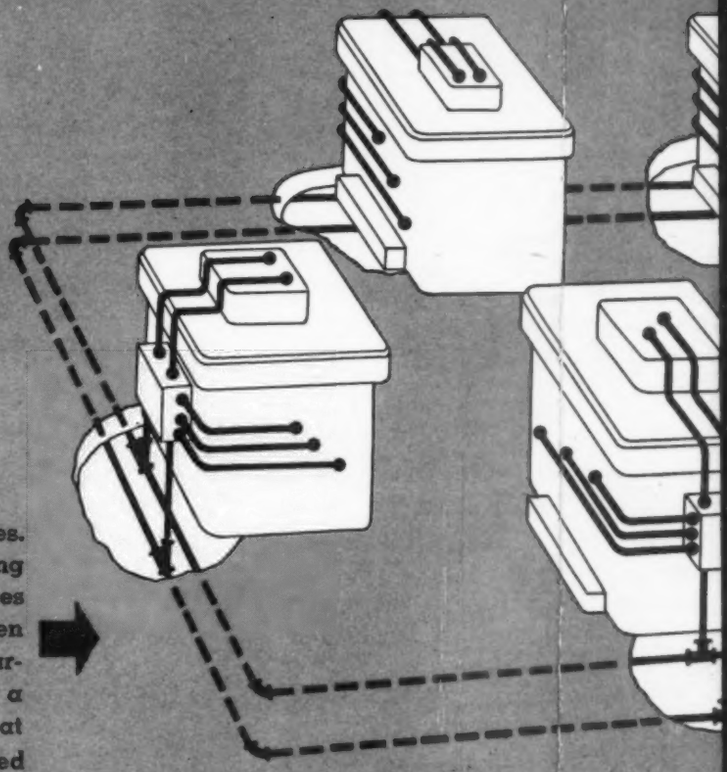
PUBLISHED AS

RICANT TO THE BEARING

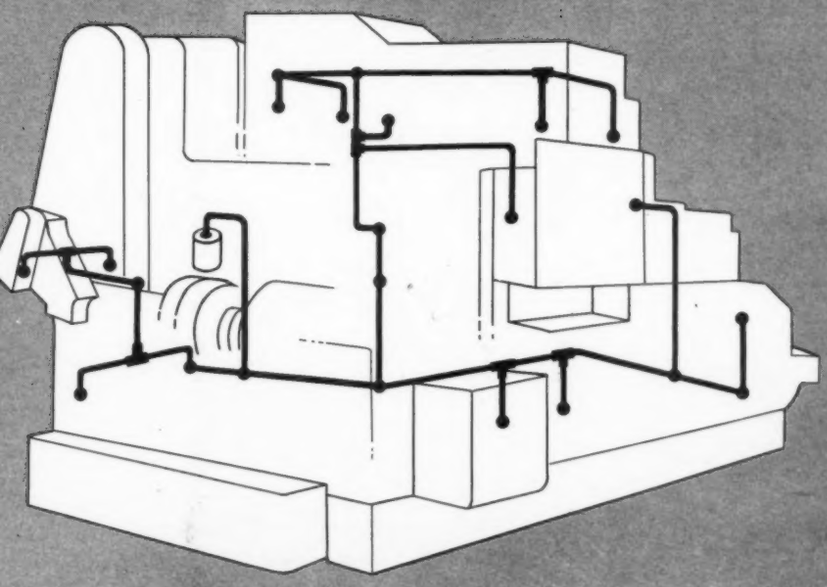
RUNT, Associate Editor, *FACTORY*

Centralized storage of lubricating, cutting, and other oils, and transportation to the point of use through pipe lines. Upon delivery each oil flows by gravity to an individual storage tank. From these tanks kerosene, and turbine, cylinder, and lubricating oils are pumped to the storeroom, from which they are dispensed in small quantities. Soluble oils are pumped from storage to a large settling tank, then delivered at 40 pounds pressure to the machines. The oil returns by gravity to the settling tank. (Illustrated is practice of Republic Steel Corporation)

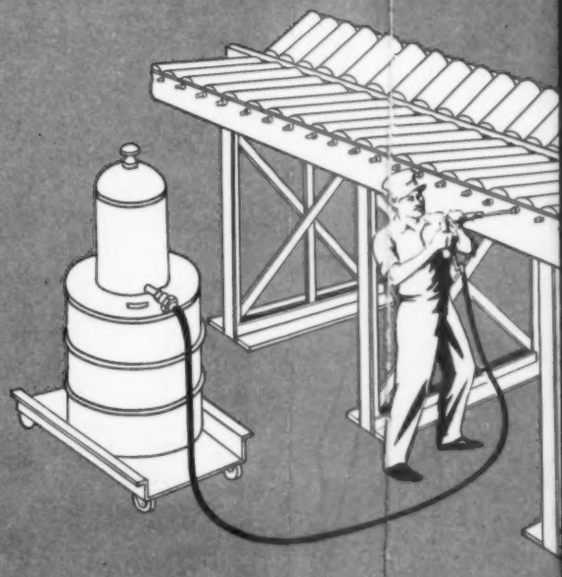




Automatic lubrication for a group of machines. Grease is supplied by motor-driven pumping unit. Controlled by time clock, the pump forces grease first into one of two supply lines and then into the other, to operate the valve at each bearing. Reversal of flow is accomplished by a pressure-operated reversing valve located at the return end of the supply lines. (Illustrated is the Farval system)



A central reservoir system in which oil is fed to all bearings under pressure. (Illustration courtesy of Bijur)



Individual grease fittings

SHED AS PART OF THE APRIL, 1943, ISSUE OF FACTORY MANAGEMENT AND MAINTENANCE

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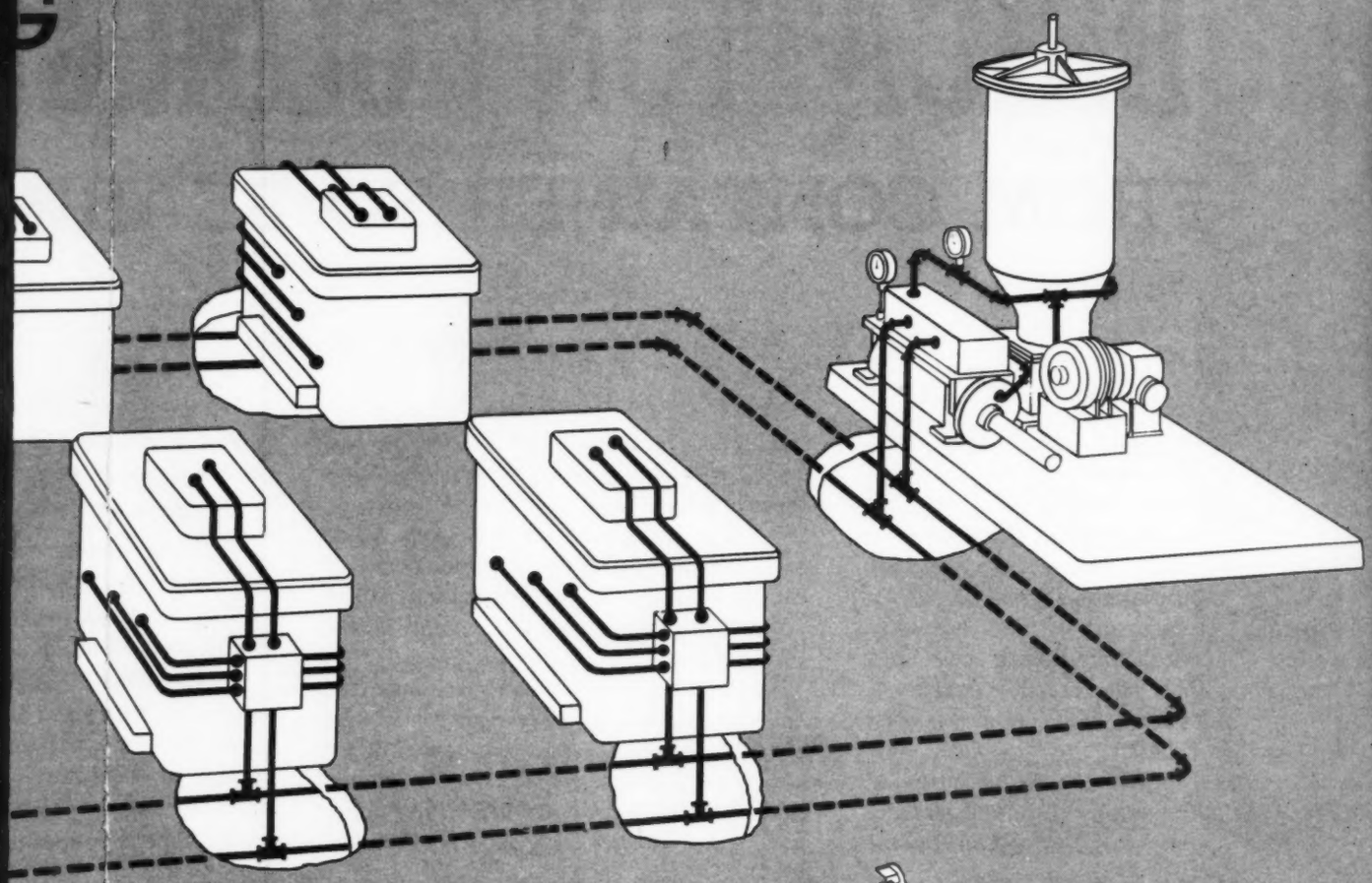

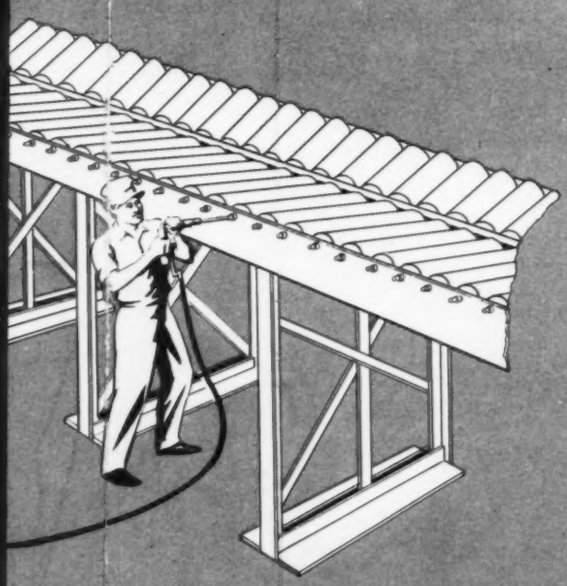

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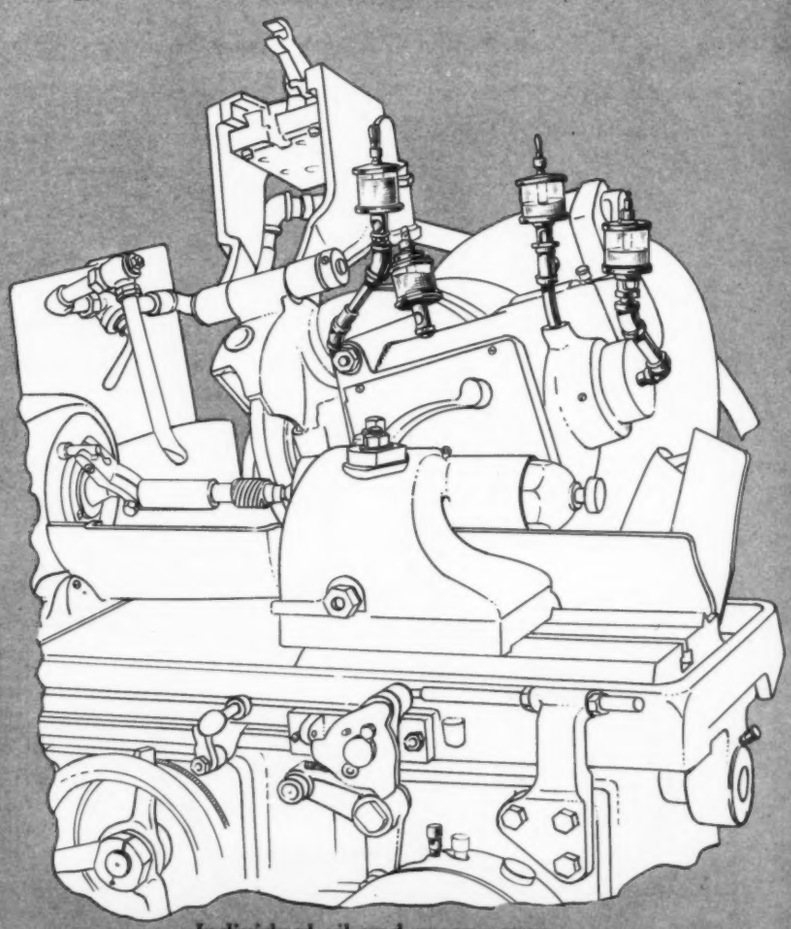


Individual oil and grease cups

ND MAINTENANCE

Steps that guard America

He walks alone. His footsteps, plodding down some unnamed, silent beach, are a trail of protection between you and our Axis enemies.

Within the nation itself, there's a guardian's job we all can share. By caring for our tools and equipment, we make them last longer . . . and so save vital metals, and time, for greater war production. Storage batteries, for instance, last longer when you follow four simple rules of conservation. Obey them and you hit the Axis. Buy to Last and Save to Win!

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
Exide Batteries of Canada, Limited, Toronto

STEPS THAT GUARD BATTERIES!

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

Maintenance That Cuts Out Production Stoppages

HENRY J. TENDICK, Maintenance Engineer, Belmont Radio Corporation, Chicago

At Belmont Radio we use preventive maintenance to eliminate production stoppages. Work interruptions are almost unknown, even in the face of our heavy production schedule. When the rare emergency does occur, maintenance men are paged on the factory loudspeaker system, and the preventive crews report at once.

Our most detailed program of preventive maintenance is carried out on large electric motors. Sleeve bearings are oiled once each week; grease-packed bearings are examined once a month, and grease is added if required. Dust is blown from motors once a week. Air lines have been run to isolated motors to simplify this procedure. Once a year, usually during the summer, motors are removed from their places and completely disassembled. Parts are cleaned, rings resurfaced, windings varnished, bearings cleaned and repacked, and the motor is reassembled and painted.

Yearly Cleaning

All ball bearings on motors, line shafting, or other equipment are removed once each year, cleaned, repacked, and replaced. Care is used not to pack them too tightly or with a grease that is too heavy. Gear and variable-speed drives are cleaned and their cases flushed and supplied with fresh oil once a year.

Badly worn parts and equipment that looks questionable are repaired or replaced. Effectiveness of this maintenance schedule is demonstrated by the fact that we have had no motor or bearing failures for some years.

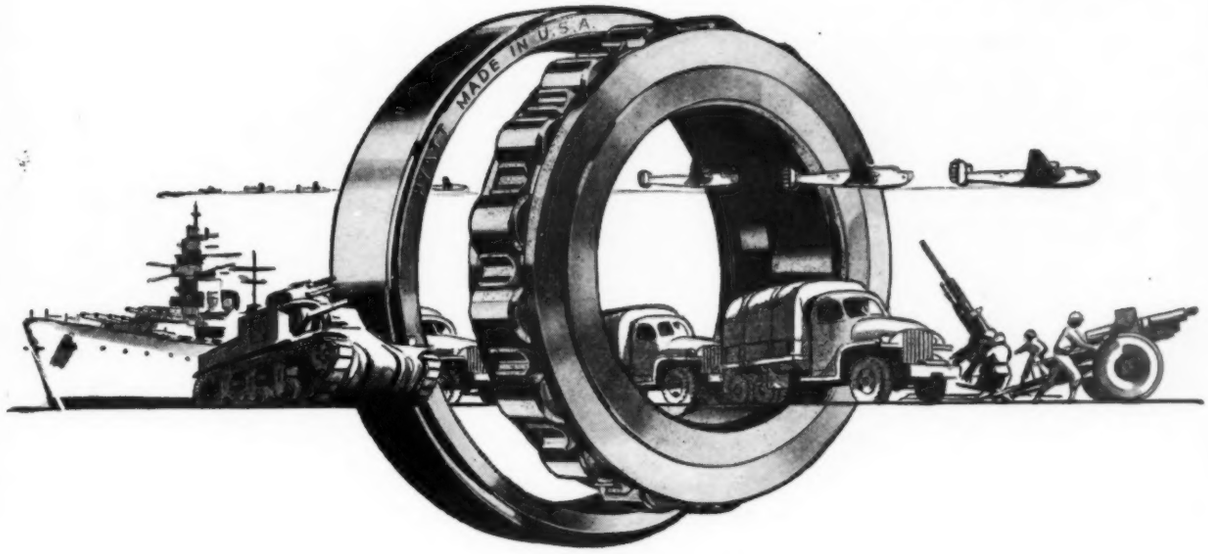
All electrical controls, including motor starters, are completely taken apart once a year. Springs, contacts, and other parts are replaced if inspection indicates any possibility of failure prior to the next scheduled examination. All connections are cleaned and tightened at the time the controls are checked.

Once every month all electrical connections are checked by touch to see that they are not hot. When hot connections or contacts are found, they are listed, and during the first "off" period the connections are opened, cleaned, and reconnected. They are watched for a few days to

Maintenance men are paged on the loudspeaker system

Keeping Them Rolling—

Our Job Yesterday, TODAY and Tomorrow!



TODAY the heavily loaded shafts, gears and wheels of vital war equipment turning on Hyatt Roller Bearings, are well protected against shocks, excessive wear and breakdowns.

And other smooth rolling Hyatts, of the same microscopic accuracy and unyielding stamina, are serving round-the-clock in the machines which help build mighty guns and planes and tanks and ships.

Prolonging machine life . . . keeping equipment going . . . has been a job done well by Hyatts for the past fifty years. And after this war's won, there will be many more industrial, agricultural and transportation bearing applications in which Hyatts will continue to serve and save for another half century.

Is there any way we can help your now? Hyatt Bearings Division, General Motors Corporation, Harrrison, N. J.

HYATT ROLLER BEARINGS

find out whether or not the trouble has been corrected. Such detailed attention may appear a bit fussy, but good voltage is essential in our work, and loose or dirty contacts and connections were found to be the cause of many of our voltage troubles. We use large cable on all our lines and take great care to keep our lighting circuit loads and large single-phase loads balanced on our three-phase power system. Frequent checks are made with clip-on instruments to keep the phases equally loaded and to prevent overloading of motors and circuits. Such meter checking is always done whenever load is being added.

Telltale Lights

We have a large number of heat circuits throughout the plant. Each of these circuits has an indicating telltale pilot light near the disconnect switch. A failure of power supply is thus immediately shown, and lost time is avoided in searching for the cause of trouble.

We use a large number of soldering irons. Some time ago we found that receptacles soon loosened so that good contact was difficult to maintain. We replaced all receptacles with the twist-tight variety and eliminated all contact difficulties. Cords on these tools have always been a source of trouble, and we replaced all lighter cords with heavy-duty type. When the change was made cable grip plugs were added. If a defective cord is found, it is replaced. No taped cords are used. When new tools are required, a heavy-duty cord and cable grip plug are installed before the tool is placed on the assembly line.

We require electric soldering-iron tips to be changed four times daily. The users of the irons change their own tips, but four men of the maintenance department are required to keep the points in condition. Two of these men gather and distribute while the other two are busy forging and filing the tips to keep them in proper condition. Again this appears to be extremely detailed, but results warrant the detail.

Compressed air and electric screwdrivers are similarly serviced. One man devotes his full time to the care of these screwdrivers, and defective ones are promptly replaced by instruments that have been serviced. In order to insure continuity of service, an inspection schedule of these portable devices was set up. Once each two weeks every portable electric tool is brought to the maintenance shop, where it is inspected. The maintenance department receives virtually no calls to remedy portable tool trouble.

One man's sole duty is the control of temperature and ventilation in factory buildings

We have several motor-generator units that supply high current at low voltages. The generators require constant attention to commutators and brushes to prevent sparking and voltage variation. All the units are inspected three times each day, and any sparking, discoloration, or other indication of trouble is promptly remedied. Only experienced men are permitted to work on these generators.

Battery Care

A large number of small storage batteries are in use throughout our plant. All batteries are under the constant care of one man who keeps them charged, clean, and ready for immediate use. Plates, separators, and connections are replaced whenever needed.

Throughout the whole maintenance program we used new replacement parts for worn or damaged parts. We feel that this is the least expensive and the most productive procedure. If new parts are not available, the best possible repair is made.

As a part of our preventive maintenance program, we have a force of twenty men and two women who keep all parts of the plant clean at all times. Each person of this group has an assigned area to clean. Debris is not allowed to collect under assembly lines, in aisleways, or in any spaces. Rubbish is accumulated in containers, and hauled away twice daily. A disinfecting company takes care of all deodorizers and related facilities. Toilet and washroom floors are mopped daily, and thoroughly cleaned and sealed each month. The resulting cleanliness and neatness reduce accidents and tend to decrease absenteeism.

We have one man on the maintenance crew whose sole duty is the control of temperature and ventilation in the factory buildings. He constantly checks thermometers, windows, and drafts. We feel that his part in preventing colds is as important as any of the preventive procedures we use.

The entire maintenance organization is set up on a basis of preventive work, and we have so few emergency calls that such a call is an emergency in itself. The maintenance organization is large and uses high-grade personnel. We are firmly convinced that preventive maintenance is the least expensive and most satisfactory way of maintaining the high production schedules necessitated by the war. We have used this principle for some time, and find that maintenance becomes expensive the minute we relax vigilance. We keep all facilities in as near 100 percent condition as we can.

★ The well-maintained plant is the high-production plant

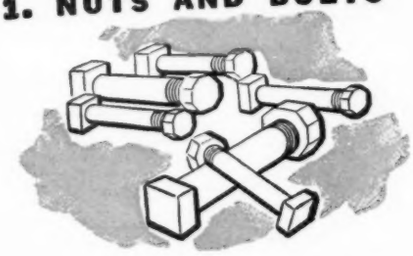
Welding piping with Tube-Turn fittings conserves 4 vital materials . . . checks war-time pipe failures, stops leaks!

NO. 4 OF A SERIES

HOW TUBE-TURN WELDING FITTINGS BENEFIT WAR INDUSTRY

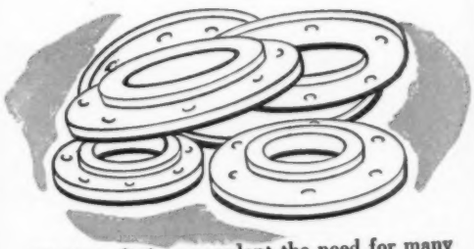
The FIRST WELDING FITTINGS 1st AND STILL THE BEST

1. NUTS AND BOLTS



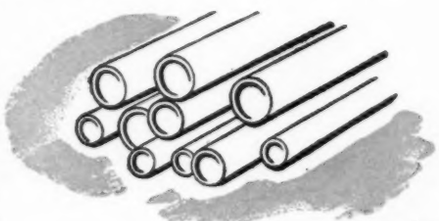
Joints welded with Tube-Turn fittings require no nuts or bolts. Maintenance time and trouble spent in tightening bolts is eliminated.

2. FLANGES



Welding fittings supplant the need for many of the flanged joints necessary in screwed piping—save both weight and critical metal.

3. PIPE REPLACEMENT



When welding fittings are used, you never have to replace any pipe because of worn threads or damage due to replacing flanged fittings.

4. GASKET MATERIAL

Fewer flanged joints mean fewer gaskets to replace. No materials or time wasted when connections are welded with Tube-Turn fittings.

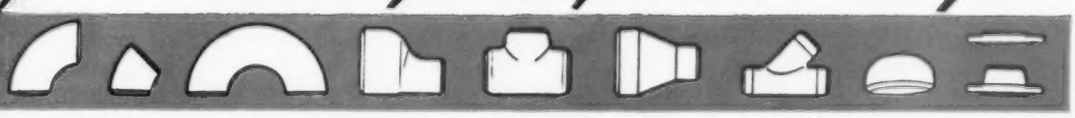
When you multiply these savings over an entire piping system, the amount of critical materials conserved is tremendous. Tube-Turn welding fittings aid the war effort in *other* ways, too—less danger of plant shut-downs due to piping failures; maintenance is virtually eliminated; less installation time is needed because alignment is easier, only simple butt welds are required, and complete sections may be pre-assembled then welded into position. For *stronger, lighter, permanently leakproof* piping systems—weld with Tube-Turn fittings!

TUBE-TURNS (INC.) LOUISVILLE, KY. *Branch offices:* New York, Chicago, Philadelphia, Pittsburgh, Cleveland, Dayton, Washington, D. C., Tulsa, Houston, Los Angeles. *Distributors in principal cities.*

TUBE-TURN

TRADE MARK

Welding Fittings and Flanges



Safety With Transparent Plastic Guards

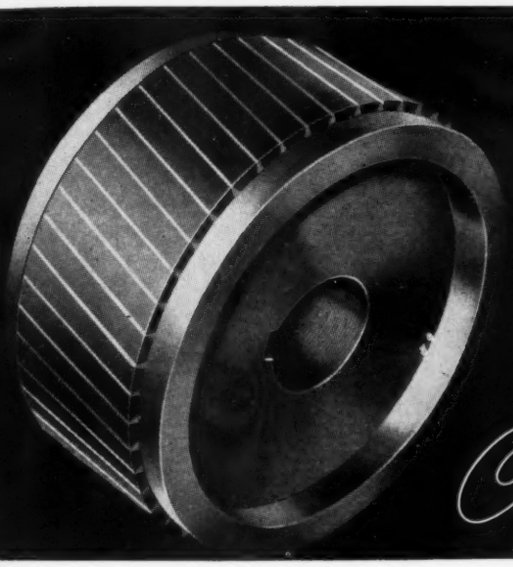
THE TOUGH, TRANSPARENT plastics used for gun turrets and bombardier compartments in planes make the best kind of safety guards for machines and processes. Pictured on this and the following page are samples. Included are covers for bandsaws, drill presses, grinders, and soldering equipment. All were suggested by safety-conscious workers, then designed, formed, and machined in the maintenance shops of a half-dozen of our busiest aircraft plants. They will undoubtedly suggest many other applications in many another industry.

For example, soldering operations have been safety-insured in Bell Aircraft's electrical department by placing a Plexiglas shield over soldering pots. At North American Aviation, a little ingenuity resulted in a clear shield for bandsaws. Designed by a worker, the shield eliminates the need for goggles, or, when goggles also are necessary,

Photographs by courtesy of Rohm & Haas Company

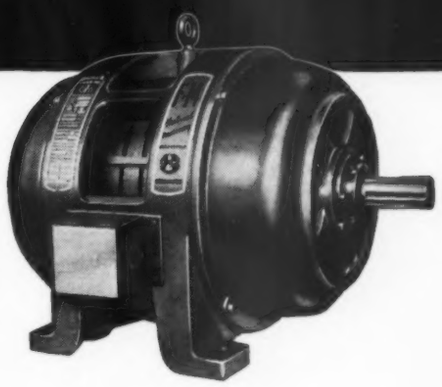
Transparent plastic shield over a soldering pot prevents spattering of molten metal in Bell Aircraft's electrical department. Equipment for working plastics is available in most plants. Parts are easily shaped with temperatures of 220 to 300 degrees Fahrenheit, using simple forms

You don't need Extra Size



With this Extra Quality

Copperspun



● No need to tell you that wartime restrictions make it impossible for you to get extra-size or extra-horsepower motors for any job that calls for specific horsepower.

But don't let that worry you for a single moment. Put Fairbanks-Morse Motors with Copperspun Rotors on the job—and you *do not need* extra horsepower or extra size.

The reason, briefly stated, is this: The winding of the F-M Copperspun Rotor is centrifugally cast, in *one piece,* of pure *copper.* No other rotor is cast of *copper.* Copper has better thermal characteristics. Copper has better electrical characteristics. For these reasons, you can run a Fairbanks-Morse Motor with Copperspun Rotor *under full load indefinitely* without danger of damage through overload.

Naturally you'd rather not buy horsepower you don't need — if you can do so safely. Now you can.

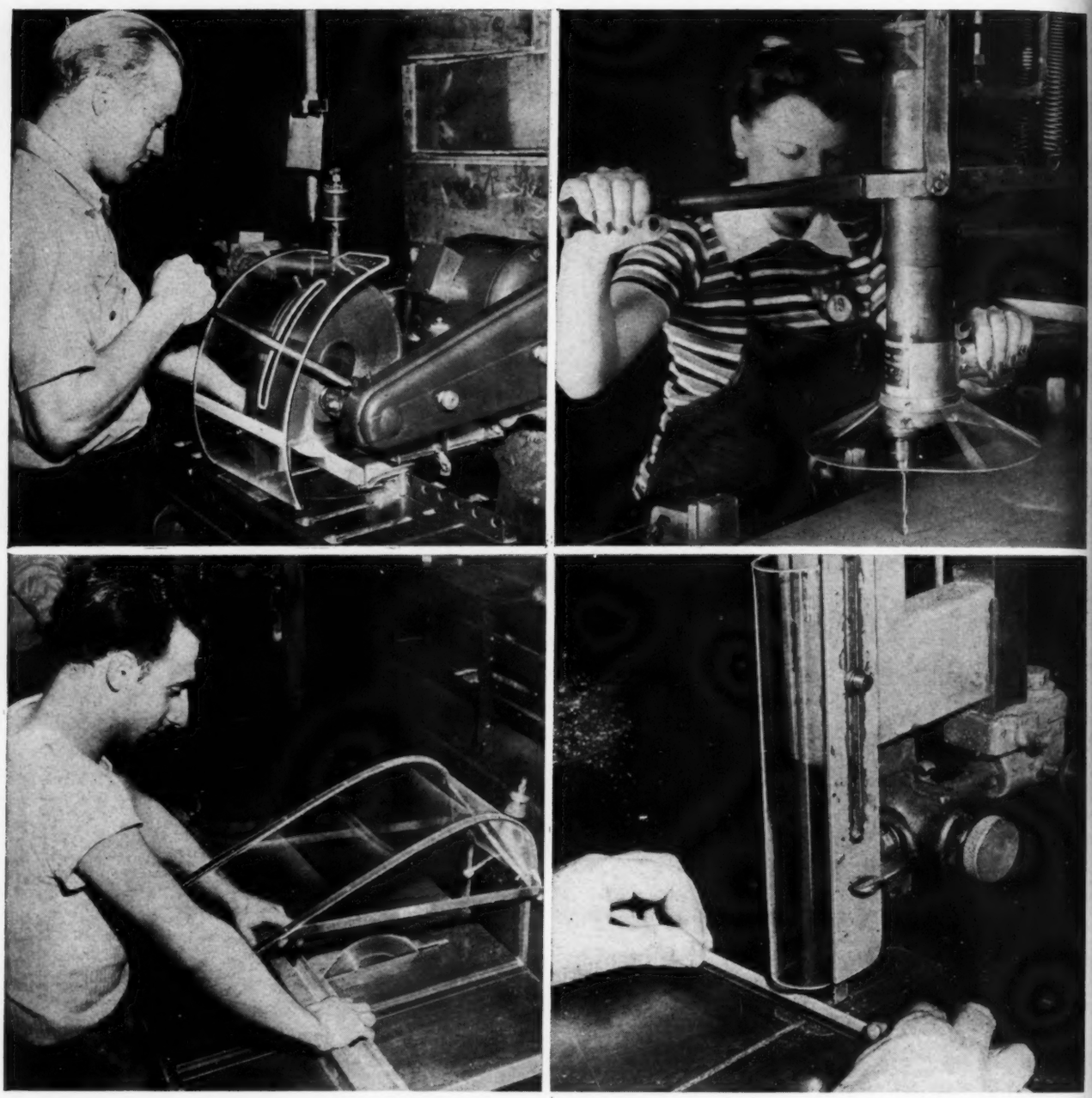
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago. Branches with service stations throughout the United States and Canada.

FAIRBANKS-MORSE

DIESEL ENGINES
PUMPS
MOTORS
GENERATORS
SCALES
WATER SYSTEMS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS
RAILROAD EQUIPMENT

F M

Motors



Saw shields of transparent plastic save eyes and faces from flying metal particles. Left, top and bottom, are shields designed by methods engineering at Republic Aviation. At Consolidated Aircraft, a drill press skirt (upper right) protects the operator. Lower right-hand photograph shows a bandsaw shield designed by a worker at North American. Plastic shields are easy to install and to clean

prevents fogging and dirt-clouding. Men at North American dislike wearing safety goggles as much as men in other plants. Shields that confine flying pieces, thereby taking the place of goggles, have helped as accident reducers.

Consolidated Aircraft workers have developed skirt-like bells for drill presses. Simple devices that prevent dust from flying, these shields were easily made.

From transparent plastic, Republic Aviation's methods engineering department designed shields for circular saws and other machines that spatter pieces and grinding dust into the faces of operators. Easily formed when heated, plastic shields were invented to meet exigencies as they occurred.

Accident Reducers

Workers find them easy to attach and to remove for cleaning. Despite doubled employment, devices such as these have helped materially in reducing Republic's accident record.

Equipment for working plastics is available in most manufacturing plants. Parts may be shaped with temperatures of 220 to 300 degrees Fahrenheit, using simple forms. Plenty of soap and water or a water solution of a synthetic wetting agent, aided by the worker's bare hands (bare hands have proved more satisfactory for polishing than soft cloth or chamois), do the cleaning trick. Rubbing with a dry cloth may scratch the surface, and builds up an electrostatic charge which attracts dust. Damage may be avoided by blotting with a clean, damp chamois. Application of a good grade of wax prevents scratching.

Green worker—but he's safe!

He's a new man in a vital war plant . . . working long hours . . . sometimes forgetting to be careful. Here is a real job for "A.W." Rolled Steel Floor Plate—to stop the alarming increase in slipping and falling accidents, to end floor troubles for good. "A.W." Floor Plate protects men essential in the war effort wherever they may be. Fire-proof, heat-proof, oil-proof, crack-proof. Write for folder.

Other products include Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal

Maintenance Shorts

(*Continued from page 76*)

recorded conditions of tires from purchase to permanent removal from service, we are able to check each driver's method of operating his truck.

Drivers who violate rubber conservation rules are called in for conferences, and their part in our conservation program always becomes enthusiastic when they realize that "it matters."

Tread depths at various stages of usage, transfer from one wheel to another, dates and costs of recapping or repairs, cause of removal, speedometer readings, and mileage are among the facts recorded. We provide a card for each tire in service, keeping them in post index files for easy reference and to facilitate comparison of records.

•

Electrical Instruments Solve Many Problems

MIKE KALLAHER, Plant Engineer, Spicer Manufacturing Company, Toledo

A wattmeter, voltmeter, ammeter, and power factor meter comprise a kit that enables us to solve a variety of production and electrical problems.

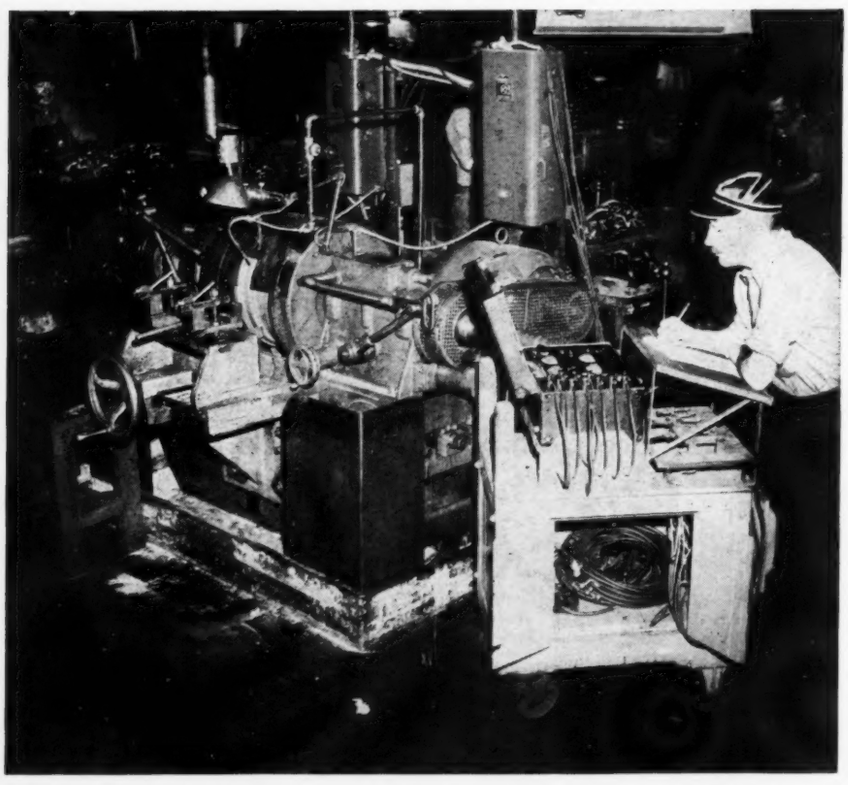
For example, a foreman complained that the motor on a hydraulically operated cutoff machine was not powerful enough. Our instrument kit showed that the motor operated satisfactorily through a part of the cycle, but was overloaded at another point. The ampere and kilowatt readings went up and the power factor reading went down. It was then found that a valve was opening up improperly, because of worn cams, and the resultant increase in pressure caused overloading of the motor.

A somewhat similar problem was encountered with a drill having a hydraulic feed. For the first two hours after a shutdown, when the oil was cold, the motor would trip out frequently on an overload. Tests showed that the motor had sufficient capacity when the oil was warm. Therefore a heating unit was installed on the machine to keep the oil warm. A larger motor was thus not needed.

This instrument kit also comes in handy whenever a new machine is to be bought. With it we find the power requirements on a similar machine or job and thus are able to specify the correct motor size.

For greater ease in making tests the instruments have been mounted on a truck, as shown in the illustration, fitted with a test plug. When a test is to be made, the machine plug is pulled from the power duct and the test plug inserted in its place. The machine plug is then inserted in the bottom of the test plug.

At one end of the truck, facing the instruments, we placed a shelf which is slightly inclined to facilitate the recording of readings while in the standing position. Below this shelf are mounted 5-, 25-, and 125-amp. switches, all connected in the truck circuit. Any current range may be secured merely by closing the appropriate switch.



Making electrical tests becomes a simple matter with an outfit like this

Knock-Down Table for the Shop

JOHN E. HYLER, Peoria, Ill.

Ordinary tables are unwieldy things to shift and store. The simple four-piece table illustrated here can be quickly assembled or knocked down; and stored in a minimum of space. Its construction is a one, two, three process.

The top of the table is a piece of plywood, preferably five-ply fir, with three holes bored in it in triangular formation. The three legs are taper-turned pieces of some substantial hardwood, one end being shaved a bit smaller in diameter than the holes in the table top. The top settles down solidly over the legs, which are easily inserted, and the table is ready for immediate use. To remove the legs, simply lift the table top a bit and strike the top ends of the legs with a hammer.

If a shelf table is desired, bore slightly larger holes in a duplicate of the table top. Slide this piece onto the legs and add the top. Shelves make the table more rigid, and as many as desired may be added. Their position on the legs will be governed, of course, by the size of the holes bored in them.

If desired, a four-legged table can be made by drilling four holes in the top instead of three.

•

Control of Revolving Screen Saves Power

S. H. COLEMAN, Staunton, Va.

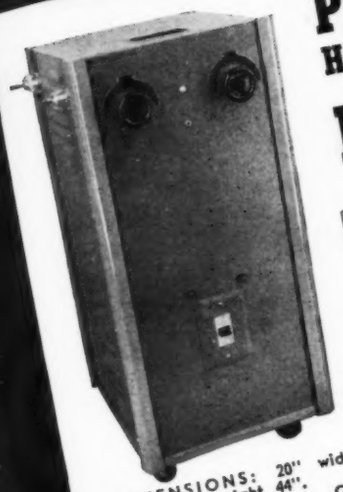
At a large industrial liquid waste disposal plant, where waste is pumped intermittently from sumps, a traveling screen is used for the removal of solids. Originally this screen operated continuously, even though flow was intermittent.

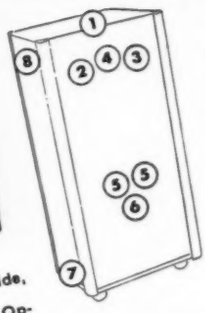
To save power an auxiliary interlocking circuit was installed between the magnetic switches of the sump pump and screen motors. Thus, with an auxiliary contact in the sump controller, the screen runs only when the sump pump is running and waste is actually being carried off, rather than operating all the time.

For faster, uniform bonding or heat processing of non-conducting materials . .

Portable THERMEX HIGH FREQUENCY HEATING UNIT

No. 1





Thermex No. 1 is ideal for bonding or heat processing small parts of wood (such as airplane members), plastics or other non-conducting materials.

The advantages of Thermex high frequency heating are many. The speed of heating is many times faster than by any other method, and the temperature rise thruout the mass is *equal at any time—thus assuring absolute uniformity* in heating.

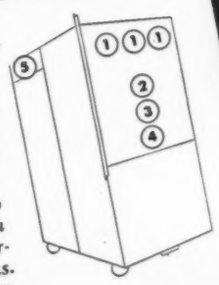
Thermex No. 1 is also recommended for laboratory and experimental work. Extremely portable. Simple to operate. No special experience is required.

Position of numbers on drawing at left identifies Thermex parts shown in photo: 1. *Load meter.* 2. *Load control.* 3. *Reset control.* 4. *Stop button.* 5. *Indicating lights.* 6. *Main switch.* 7. *Electric input receptacle.* 8. *High frequency output terminals.*

DIMENSIONS: 20" wide, depth 23", height 44". NET WEIGHT: 375 lbs. Operates on any 110 or 220 volt, 60 cycle, single phase line.

Portable THERMEX HIGH FREQUENCY HEATING UNIT

No. 15



Thermex No. 15 has a heating capacity more than 13 times greater than Thermex No. 1. This unit is for bonding or heat processing larger sections or quantities of non-conducting materials.

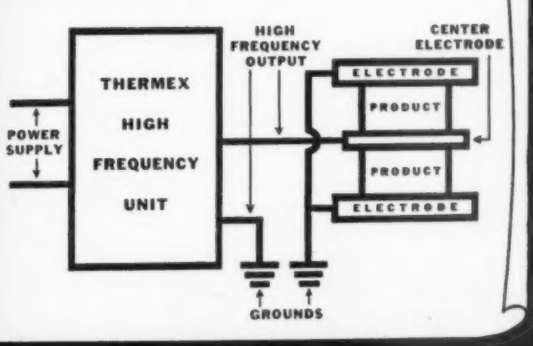
Accurate control and uniformity of the heat improves the quality of the product being processed or bonded, and the operation is accomplished in a fraction of the time required by other methods. All adjustments are easy. Indicating meters give an exact report of the heating operation at all times. The operation of Thermex is simple. Special training in electronics is *not* necessary.

Position of numbers on outline drawing to right identifies Thermex parts shown in photo: 1. *Load indicating meters.* 2. *Circuit switches.* 3. *Start-stop push buttons.* 4. *Load adjustment controls.* 5. *High frequency output terminals.*

DIMENSIONS: 37" wide, depth 64", height 80". NET WEIGHT: 2900 lbs. Operates on any standard 220 volt, 60 cycle, three phase line.

Send for illustrated Thermex booklet!

HOW THERMEX EQUIPMENT WORKS:



The GIRDLER CORPORATION

THERMEX HIGH FREQUENCY HEATING EQUIPMENT

THERMEX DIVISION • LOUISVILLE, KENTUCKY

"YANKEE" TOOLS

GET THE MOST OUT OF RATIONED TIME

A half-century before death rained from the skies over Pearl Harbor, "Yankee" Tools were putting *extra* minutes, *saved* seconds, into the hands of skilled mechanics everywhere. Now, when time is of the essence, "Yankee" Tools continue to speed production, to salvage that remnant of time left to America in which to deliver the knock-out blow.

The war we didn't want will be behind us one day, and "Yankee" Fine Mechanics' Tools will have had a part in putting it there. In the meantime, give America, and all America means to you, your best. And, when you re-order "Yankee" Tools, be sure to provide priority ratings whenever possible. Order from your supply house or write to us . . . c/o Dept. FMM4.

"YANKEE" VISES

Four Handy Sizes with Swivel Base. V-block holds round stock securely.

"YANKEE" TOOLS

make good mechanics better

North Bros. Mfg. Co., Phila., U. S. A.

Established 1880

YOU WANT TO KNOW

more about the items mentioned on this page

Letters to the addresses given will bring information

• "IT AIN'T THE INDIVIDUAL nor the Army as a whole, but the everlasting teamwork of every bloomin' soul," so runs the preface to a booklet called "Teamwork for Victory"—a resume of what the pooled brain-power of engine-tinkering American mechanics has done for war production. Put out by the Automotive Council for War Production, New Center Building, Detroit, this booklet gives results of the planned teamwork of the automotive industry. Copies are available by writing to the Council's public relations department.

• "POST-WAR PLANNING METHODS" by S. Duncan Black, president of The Black & Decker Mfg. Company, has been made up in booklet form. Starting with a hypothetical post-war budget, which ups employment 20 percent and lowers product prices 20 percent, a basic guide is established. The effect of taxes on post-war planning, market expansion and cultivation, national and international markets, nourishing of small and new businesses, and contingent compensation are discussed. A cost-conscious organization which provides the working man with the best equipment available and with aggressive leadership is advocated.

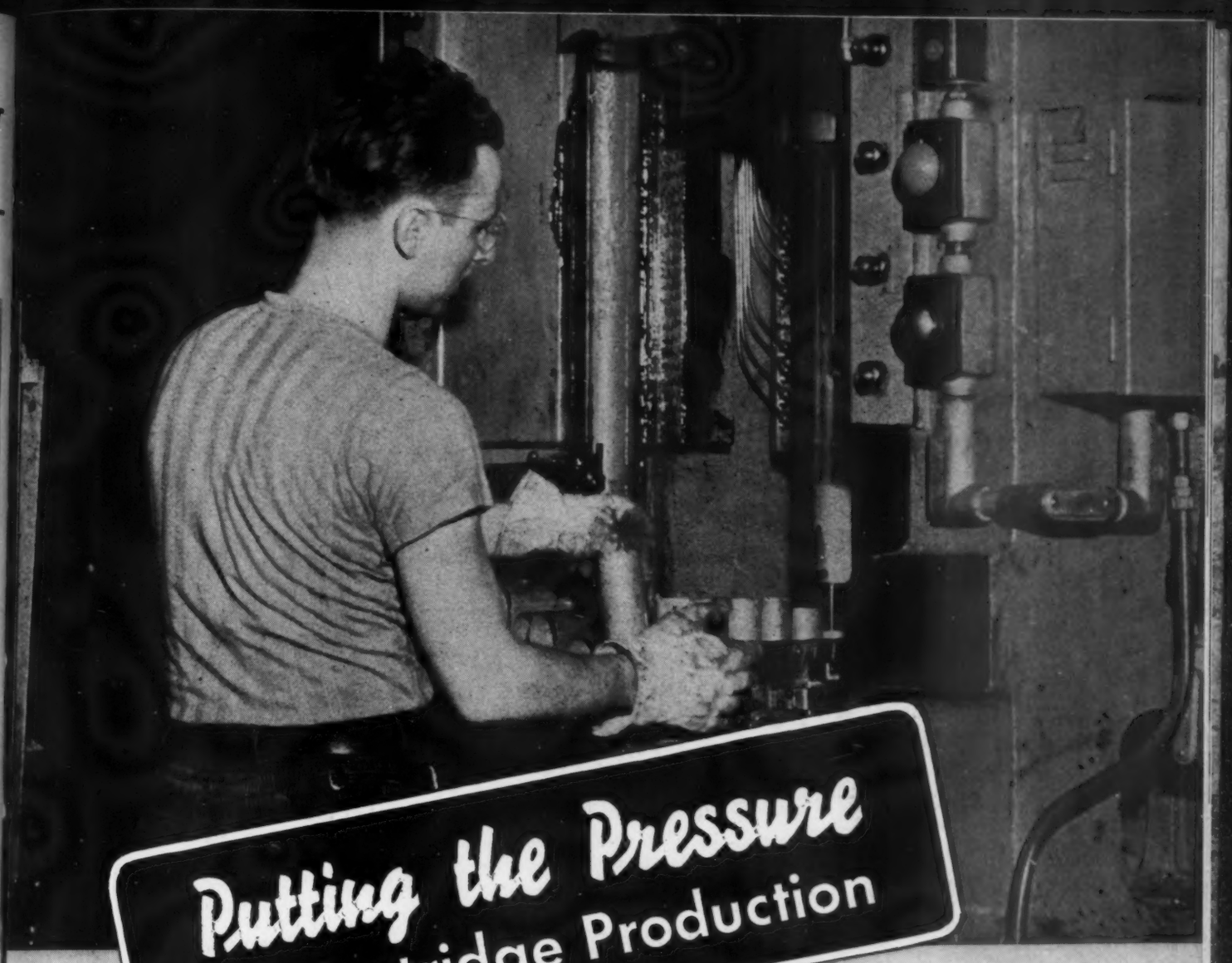
INDUSTRIAL SAFETY MASK offers complete visibility from all angles. Made of lightweight Lumarith, product of Celanese Celluloid Corp., the mask is held in place by an elastic band, and will fit over eyeglasses. The eyepiece, which snaps into place, is replaceable. Comes in clear Lumarith or pale green tint. Made by DuBois Plastics, Detroit; distributed by American Allsafe Co., Inc., Buffalo, N. Y.

DASHING "KM" SAFETY TOGS for women workers offer style as well as protection. This head to foot line of apparel is made of fireproofed, heat-resisting materials. Manufactured by F. H. Wheeler Mfg. Co., 224 West Huron St., Chicago.

• APPRENTICE-TRAINING Service of the War Manpower Commission, Washington, D. C., has put out two booklets on the subject of apprenticeship. Booklet "Apprentice Training for America's Youth" stresses the preparation of 16- and 17-year-old youths for war work and also for careers as craftsmen after the war. Explains how training on the job can be combined with completing high school studies. Booklet, "The National Apprenticeship Program," is intended to provide answers to most questions that may be asked about the program.

• "DO YOUR PART—EVERY PART COUNTS" is the slogan on posters addressed to workers in "bits and parts" industries. "What happened to the 4999th?" is another poster poser that makes workers stop to think about the failure of the smallest part—a big gun at the front has jammed because one of its 5000 parts is missing. These poster pleas to workers to see that the parts they make are not "quitters" are available from the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

• BASIC POLICIES AND PROCEDURES of price adjustment boards and sections representing the War, Navy, and Treasury Departments and the Maritime Commission are discussed in "Mechanics of Renegotiations," reprinted in booklet form from the March, 1943, issue of "The Journal of Accountancy." The text describes circumstances under which government contracts are subject to renegotiation; reviews typical renegotiation proceedings;



Putting the Pressure on Cartridge Production

SOLNUS HYDRAULIC OILS

On the job 8760 hours . . . Still good for many more!

If you are running your hydraulically operated equipment on a "round-the-clock schedule" here are facts on hydraulic oils you should consider.

In a large cartridge-making plant three lines of hydraulic presses were drawing the brass cases from cups to finished size on a 24-hour a day schedule. In each of these presses a different oil was used—Solnus Hydraulic Oil, a competitive oil of equal price and another costing considerably more.

After all three had been in continuous operation for 8760 hours at pressures up to 2500 pounds per square inch samples were taken of each and tested for all the essential characteristics. The results? Solnus Hydraulic Oils were in practically new condition ready for many more hours of extra service, while the other oils showed a deterioration to such a degree that they were ready to be changed.

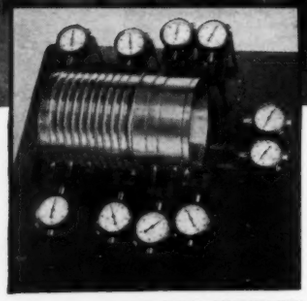
This is only one of the many instances in which Solnus Hydraulic Oils have demonstrated their long life and ability to stand up under pressure. If you want to improve the operation of your hydraulic system call in a Sun specialist—one of those Doctors of Industry. He's ready, willing, and able to help you keep your production on a round-the-clock schedule. Write . . .

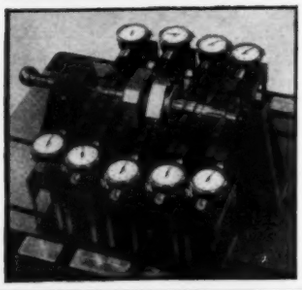
SUN OIL COMPANY, *Philadelphia*

Sun Oil Company, Limited, Toronto, Canada

SUNOCO

SUN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*





Why don't you use MACHINE GUN methods for inspection . . . . ?

One-at-a-time inspection of dimensions is only single-shot rifle shooting. The men at the fighting front use faster methods, but how about you on the home front?

These gages show how nine and ten dimensions can be inspected in a fraction of the former time — *more positively* — and *more accurately*. Investigate this fast, accurate and low cost method of inspection. Write to:

FEDERAL PRODUCTS CORPORATION
PROVIDENCE RHODE ISLAND

★ ★ ★ ★ ★ **FEDERAL** ★ ★ ★ ★ ★

PRECISION MEASURING INSTRUMENTS

Chicago · Cleveland · Detroit · Hartford · Los Angeles · Milwaukee · Montreal · Indianapolis
New York · Philadelphia · Pittsburgh · Rochester · San Francisco · St. Louis · Toledo · Toronto · Windsor

Dial Indicator Truism—

Gaging without **Dial Indicators** is like shooting without gun sights.

Put **Dial Indicators** on your gages and see where you are shooting.

FEDERAL

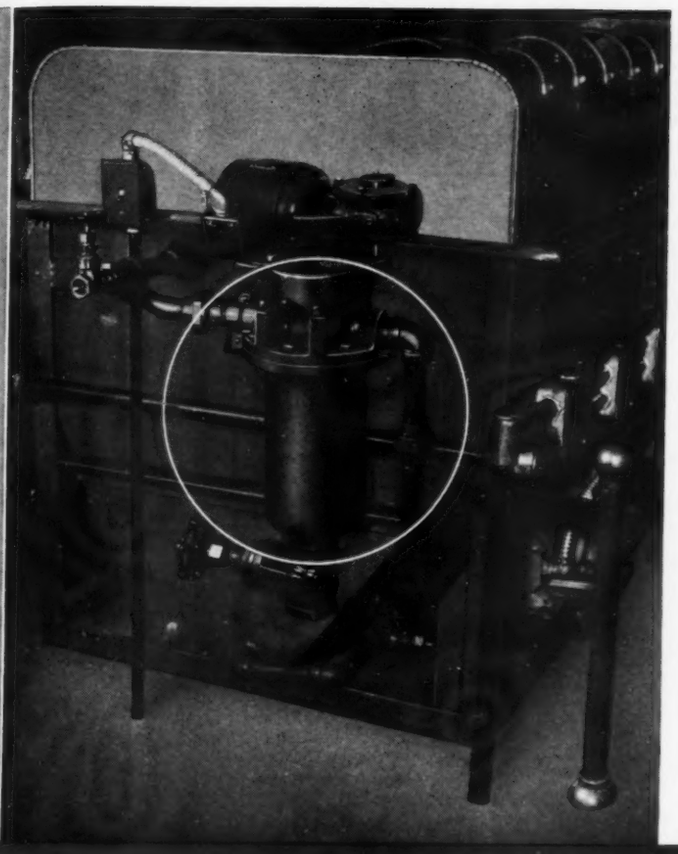
indicates the kind of information usually requested from the contractor; and explains the role of management and the independent auditor in renegotiation. Available from the American Institute of Accountants, 13 East 41st St., New York.

PAPER CAPS that are claimed washable make a light, cool protector for the hair. An adjustable drawstring holds the cap snugly to the head. Disposable paper masks are also available. Aldine Paper Co., 373-375 Fourth Ave., New York

• A SUCCESSION OF LOST minutes adds up to hours, days—and men's lives when workers in war industries fail to make every moment count. This is the theme of a sound slidefilm on absenteeism offered by the Dartnell Corp., Chicago. "The Power of a Minute" dramatizes a 16-minute story of what happens when guns, ships, and planes fail to arrive because someone wasted minutes at the production end of the line.

• AN INVISIBLE "RAINCOAT" which can be formed on cloth, paper, and many other materials to make them water-repellant has been developed by General Electric's Research Laboratory, Schenectady. Articles to be treated are exposed in a closed cabinet for a few minutes to the vapors of the new compound, called Dri-Film, and a thin, invisible coating is formed. Claimed to be more effective than wax in treating of ceramic parts.

• WANT TO PLANT A VEGETABLE for Victory? A plan for company Victory gardens has been issued by the National Victory Garden Institute whereby industrial plants can utilize unused tracts of ground by offering their employees a chance to garden. Devised to relieve possible food shortages, the plan outlines methods of procedure for arranging and handling a large-scale garden project for employees. Free copies of the plan are available to executives from Andrew S. Wing, Secretary-Manager of the Institute, 598 Madison Av., New York.

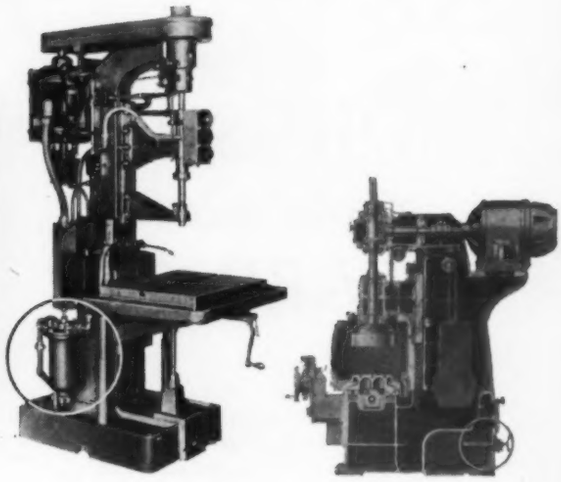


Single Machine

Abrasion Reduced, Tool Life Lengthened, by CUNO

An automatic machine turns out "grip rings" at 2¼ pieces per minute; there are three operations: boring and forming from round bar stock, machining five saw teeth inside the ring, cutting off the finished piece. Only one forming and cut-off tool is used, but two tools are used for boring and two for recessing. So the forming tool does double the work, and naturally causes more frequent delays for grinding.

A Cuno Filter with .0035" spacing between the discs, was installed to remove from the cutting oil (4½ g.p.m.) the fine chips which were contributing to tool wear. As a result, forming tool life was *doubled* — cutting delays for grinding in half — just by this change in fluid-cleaning.



NON-STOP PROTECTION

Cuno Auto-Klean (disc-type): for lube, cutting and quenching oils; and other industrial liquids.

Positively removes all solids larger than minimum size specified.

Cleanable without interrupting flow — imbedded as well as adherent solids removed.

Compact — yet full flow capacity. Wide range of sizes and metals.

Lightweight — mountable externally or unit cartridge may be built into machine.

Non-collapsible, all-metal filter element will last as long as equipment on which installed.

Completely automatic filtration obtainable with motorized units (write for special folder).

Cuno Flo-Klean (wire-wound): for river water, grinder coolant, and other liquids containing extremely abrasive particles.

Positive removal of all solids larger than minimum size specified.

Minimum pressure drop — no tortuous flow passages.

Continuous filtration — cleaning provided by backwash method.

No loss of backwash fluid.

KEEP FLOW ON "GO" WITH

CUNO

THE "FILTER-FINE" STRAINER

Write for *"Quick Facts"*—Free Catalog

CUNO ENGINEERING CORPORATION, 604 South Vine Street, Meriden, Conn.

Send me free booklet, "Quick Facts"

Name .....

Company .....

Address .....

Product to be filtered .....

☐ *Also send Free Slide Rule.....Pipe Flow and Filter Finder.*

Install

JOHNSON

Leaded Bronze

BEARINGS

How many "lazy" motors in your shop? Before you blame the equipment . . . check up on the bearings. In order to get maximum power from each unit, it is necessary to install bearings that are designed to *assist* the motor . . . not retard it.

Johnson *Leaded Bronze* Bearings enable you to get the most from your motors. A special high lead bronze alloy . . . plus correct design . . . correct tolerances . . . gives you the long life, the smooth operation and the power you have a right to expect.

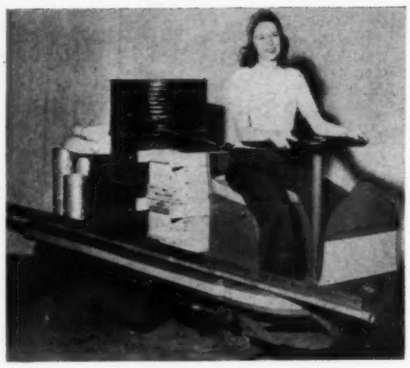
Johnson Electric Motor Bearings are available from stock for more than 250 individual types of motors. Twenty-two warehouses plus hundreds of distributors are able to give you excellent delivery. A request, on your business letterhead, will bring a copy of our new, completely illustrated catalogue.

JOHNSON BRONZE
512 SOUTH MILL STREET
NEW CASTLE, PA.

WHAT'S NEW IN EQUIPMENT

Electric Platform Trucks

Designed with an eye to women operators, the Blue Streak electrical platform truck is equipped to operate like an automobile, with a seat, steering wheel, and foot throttle. Features an 18-sq.ft. platform



of ½-ton capacity, four forward and reverse speeds from 1 to 6 m.p.h., and small turning radius. Can be used on balconies, freight elevators, and other lightly floored areas. Standard equipment includes combined foot and hand controls, hydraulic brakes, a parking brake, electric horn, and one set of 24-volt batteries. Batteries may be recharged without removal through a built-in plug at the front of the truck. For 2 m.p.h. extra speed, 32-volt batteries are available. Rocky Mountain Steel Products Co., 1346 Wall St., Los Angeles.

Building Board

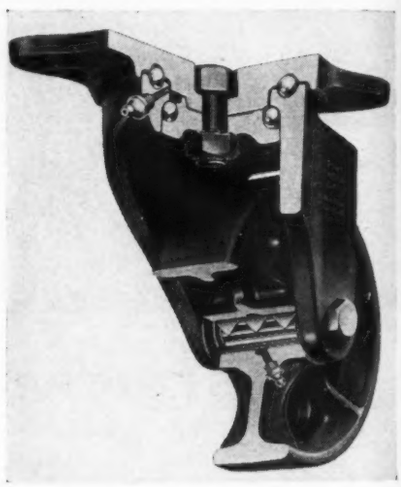
A fabricated all-purpose building board of asbestos-cement, called Stonewall, can be used for interior or exterior sheathing, fabrication of sheds and warehouses, partitions, linings. The board is made in $\frac{5}{16}$-, ¼-, and ⅜-in. thicknesses, and is said to be flexible and easy to saw, score, drill, and nail. It is claimed to be fireproof, rotproof, and verminproof, and needs no paint. Ruberoid Co., 500 Fifth Ave., New York.

Waterproof Coating

One coat of Renewall is said to seal cracks, crevices, and leaky joints. Made with an oil resin base, it dries to a hard finish that is washable, elastic, and durable. For concrete, brick, stucco, cement, or plaster walls, the material is laid on heavily with an ordinary paint brush. It can be leveled with a roller, to a smooth, stippled, or other decorative finish. Paint-Point Corp., 275 Passaic St., Newark.

Casters

Nicro Steel easy-swiveling casters for portable tanks, pumps, dollies, and floor trucks are furnished with either metal or composition floor-protective wheels. Roller bearings are standard in most models; porous



iron or other bearings can be had for metal wheels. Pressure lubrication fittings are provided in both swivel and wheel. Loads from 400 to 800 pounds per caster over wood or concrete floors are claimed satisfactory. Wheel sizes range from 3 to 6 inches in diameter. Rapids-Standard Co., Inc., 535 Bond Ave., N. W., Grand Rapids, Mich.

Variable Speed Mechanism and Gear Reducer

A drive, which consists of a variable speed transmission with built-in speed reducer, is available in two inclosed designs—horizontal and vertical. Units may be mounted in any desired position. Each design is available in a range of speeds and in capacities from 1 to 7½ horsepower. Various sizes of transmission produce ratios of speed variation from 2:1 through

MODERN GROUP DRIVES and Leather Belting SAVE MANPOWER

It is obvious that fewer "man-hours" are required to build one 20 hp. motor than four 7½ hp. motors. By using the fewer large motors necessary for Modern Group Drives, instead of many small motors for individual drives, you are helping to relieve the critical shortage of highly-skilled workmen.

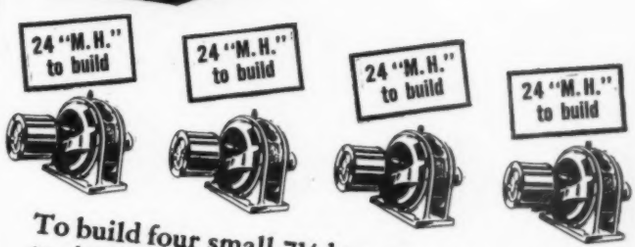
Because Modern Group Drives with Leather Belting always involve fewer parts and controls, they require less labor—and no specially trained labor—to install and maintain. Other equallyimportant wartime advantages of Leather Belting and Modern Group Drives include: saving copper and steel—lowering power consumption—increasing production—reducing shut-downs—cutting maintenance.

Your Leather Belting supplier will give you complete information on these efficient, economical drives. Consult him!

AMERICAN LEATHER BELTING ASSN.
53 PARK ROW, NEW YORK, N. Y.

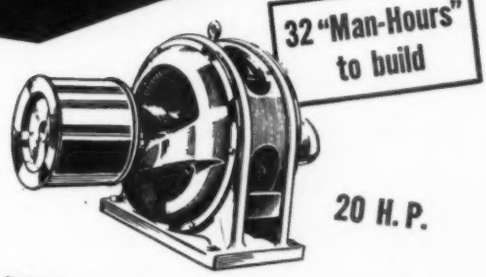
Ask Your Belting Supplier for this Booklet . . . or write

THIS WASTES!



To build four small 7½ hp. motors required to individually drive four machine tools would require about 96 "man-hours" of production time.

THIS SAVES!

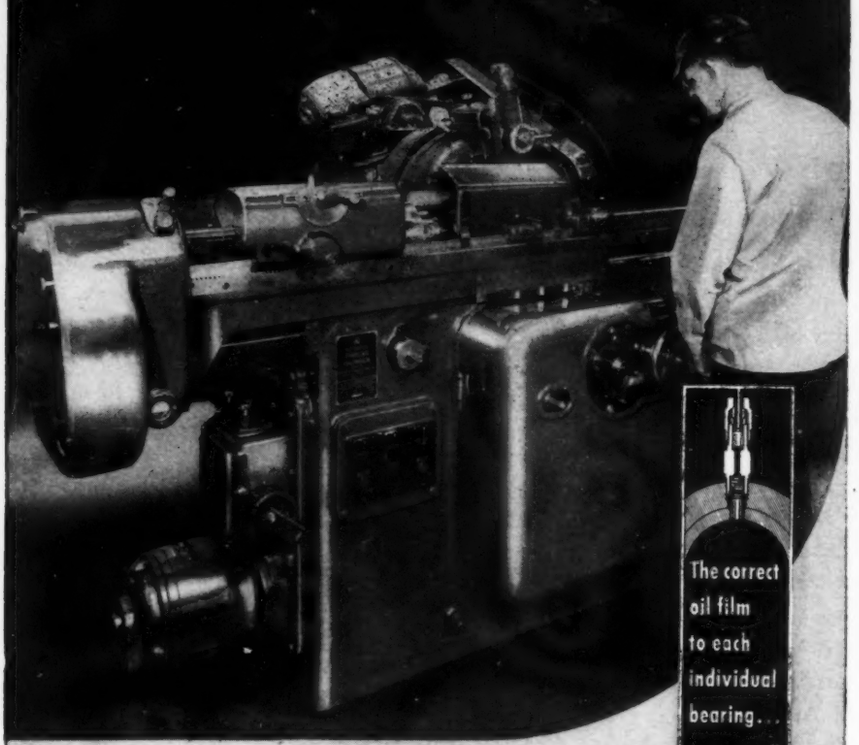


With Modern Group Drive and Leather Belting, four machines could be driven by one 20 hp. motor—which requires but 32 "man-hours" to build. Compare this with the use of 96 "man-hours" in producing the four motors in the individual drive set up.

Rely on Leather Belting

...the job done

SMOOTHLY



"JONES & LAMSON" Automatic Thread Grinder . . . with all bearings except grinding wheel spindle Bijur-lubricated.

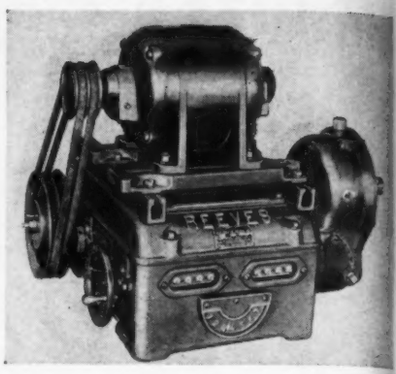
● No time is lost from productive work . . . a BIJUR-equipped machine oils itself, while running! Metered oil-feed—the correct oil-film needed by each individual bearing—is supplied automatically. The efficiency of operator and machine is raised . . . precision standards are held . . . maintenance is reduced to a minimum . . . production stepped up!

BIJUR LUBRICATING CORPORATION, LONG ISLAND CITY, N. Y.

1385

BIJUR

AUTOMATICALLY Correct LUBRICATION



12:1, and the reduction gears provide ratios up to and including 6.9:1. Speed changes are effected by handwheel or automatic regulation. Reduction gears are mounted on the variable shaft of the transmission, this shaft serving as the input shaft for the reducer unit. Reeves Pulley Co., Columbus, Ind.

Gum Solvent

A gum solvent in concentrated form that can be added to the oil in a hydraulic system is claimed to obviate flushing. Known as gum solvent "B," it is used in small portions of 3 to 5 percent of the oil in the system, and is said to put any accumulation of sludge, gum, or contamination into solution, leaving the hydraulic system clean when the worn oil is drained. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia.

Three-Lamp Ballast

A 3-lamp, 40-watt, high-power-factor ballast to simplify use of 3-lamp, 40-watt fluorescent lighting fixtures has been developed. Combining two ballasts into one

simplifies installation and reduces the amount of wiring required for connections. The ballast is designed to operate on lighting circuits of 110-125, 199-216, 220-250, and 240-280 volts. Power factor is 90 percent or above. General Electric Co., Schenectady.

Low Headroom Hoists

Low headroom hoists are mounted on trolleys to fit the monorail track system used. Hoists are built in capacities from one ton up and the drum is parallel to the tramrail track. Both cab and floor controlled types are available, and variable speed pushbutton control can be furnished. Splash lubrication assures low friction load and freedom from wear, the makers claim. Mechanical load brake and friction surfaces can be replaced without removing

YOU WOULDN'T USE LAMPS WITHOUT REFLECTORS

A light-colored concrete floor made with Atlas White portland cement is an effective giant reflector. As such it is a definite and integral part of the lighting system. It is close to the working plane, reflects light to vertical and underside work surfaces, and distributes light throughout the work area.

But how about the floor as a *giant* reflector? A light-colored concrete floor—one made with *white* portland cement instead of standard *gray* portland cement or other darker materials—is the *biggest* reflector of all. As a salvager of waste light, a light-reflecting concrete floor is a real part of the plant lighting system.

This is shown in aircraft plants built for Boeing, Consolidated, Douglas, North American and others. In the Consolidated installation at Fort Worth, a lighting survey by General Electric shows that the concrete floor built with Atlas White cement compared with a gray-cement floor in the same plant—

- ***Distributes more light throughout the working area;***
- ***Reduces shadows and dark areas;***
- ***Reflects 20% more light to vertical work surfaces;***
- ***Reflects 61% more light to underside work surfaces.***

Thus the floor is a real part of the lighting system. Because it salvages waste light, a light-reflecting concrete floor made with Atlas White portland cement—

- ***Makes seeing easier, quicker, and more comfortable;***
- ***Reduces eye strain, headaches, and absenteeism;***
- ***Reduces accidents, errors, spoilage, and shutdowns;***
- ***Increases quantity and quality of production.***

Mail the coupon for new book, "Light From Floors." It gives detailed information on the value, installation, and maintenance of light-reflecting concrete floors made with Atlas White portland cement. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

HOW ABOUT MAINTENANCE?

White-cement floors encourage cleanliness. They are light in color, have a minimum of joints to collect dust and dirt, and a relatively non-absorbent surface. Experience in the Consolidated plant shows they are easy to clean, easy to keep clean, and retain their reflection advantage. Maintenance is simple—frequent sweeping, occasional damp mopping, periodic scrubbing.

OFFICES:

New York, Chicago, Des Moines, Philadelphia, Duluth, Albany, Boston, Kansas City, St. Louis, Birmingham, Cleveland, Pittsburgh, Minneapolis, Waco.

ATLAS WHITE CEMENT

FOR LIGHT-REFLECTING FLOORS

Universal Atlas Cement Company, Chrysler Building, New York, N. Y.

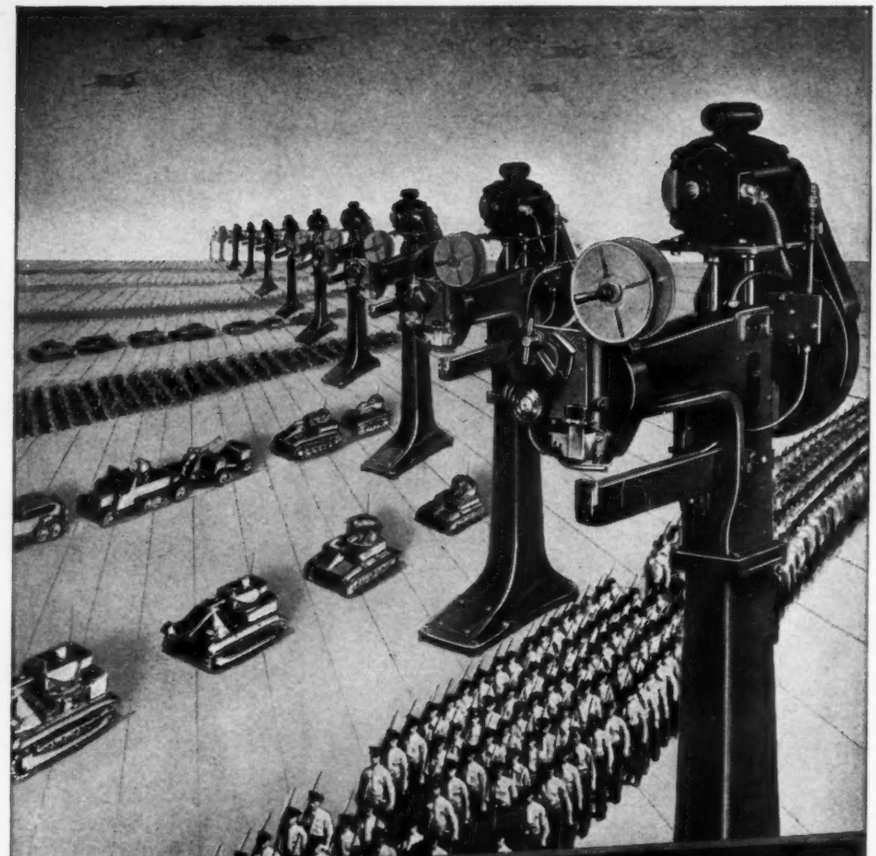
Please send me copy of new book, "Light from Floors." F-F17

Name_____

Position_____

Company_____

Address_____



Can a
Bostitch Steel Stitcher
HELP WIN THE WAR?

IT CAN AND DOES . . . speeding up production with a capacity of 300 stitches a minute, even through metals . . . often more than twice as fast as other methods of fastening.

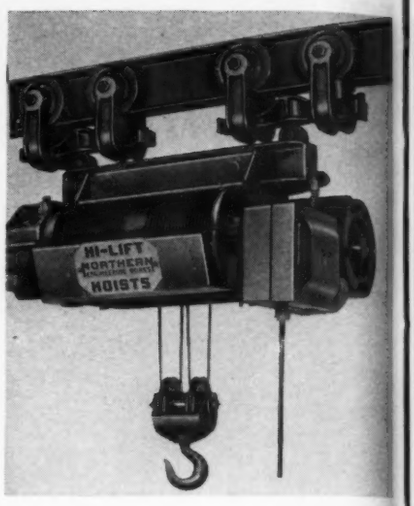
This metal-stitching machine is just one of the scores of Bostitch fastening tools drafted for the war to speed production . . . of ammunition belts . . . of plastic scabbards . . . of parts for planes and tanks . . . of camouflage nets . . . for linking portable landing fields and emergency roadways. Bostitch is used in dozens of applications newly created for war purposes . . . in thousands of established civilian products now enlisted in war services.

To meet these war production challenges, new and improved Bostitch tools are constantly being created, and will be available for peacetime use. The Bostitch line, unrivalled in its completeness, makes it possible for you to choose the right combination of machine and staple for each particular job.

If you have the necessary priorities, find out *now* if Bostitching can help speed your production... if priorities are not available, investigate Bostitching *now* so that you can apply these advantages and improvements to quick post-war adjustments and production. Bostitch, Inc., (Boston Wire Stitcher Company), 73 Blackmore Street, East Greenwich, R. I., (Bostitch-Canada, Ltd., Montreal).

BOSTITCH
fastens it better AND FASTER with wire

ALL TYPES OF STAPLES APPLIED BY MACHINES
ALL TYPES OF MACHINES FOR APPLYING STAPLES



the hoist gearcase cover. Split gearcase provides access to gearing and bearings. Northern Engineering Works, 2615 Atwater St., Detroit.

Floor Cleaning Compound

Fibre-Tex for sweeping floors clean is claimed to be grease and oil absorbing and to have an active cleaning effect when consistently applied. It is said to be fireproof against the open flame of such equipment as blowtorches, and is not subject to spontaneous combustion. Comes in 50-lb. packages. Lacey-Webber Co., Kalamazoo, Mich.

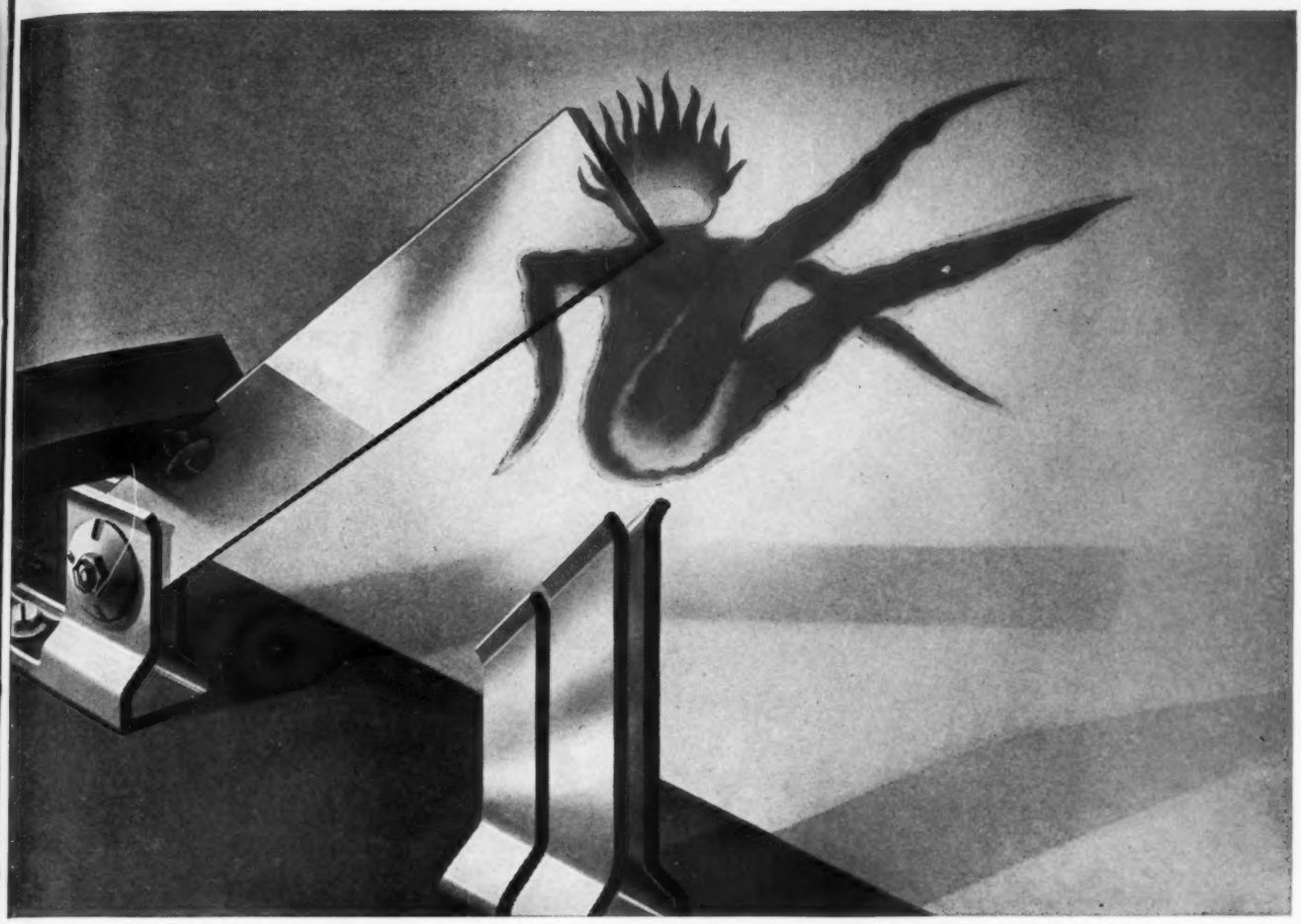
Electric Drill

Plastic-encased ¼-in. portable electric drill is lightweight and compact. Internal power unit parts are supported within an inner metal skeleton frame. Claimed to

have power, strength, and protection from shock, the Thor drill is available in three speeds—2500, 3750, and 5000 r.p.m. Weight is 3 pounds, 3 ounces; length, 8⅞ inches; and heavy-duty drilling capacity, ¼ inch. Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago.

Check-Controlled Turnstile

Employees check themselves in and out with this turnstile system. Each employee is issued two checks with his number stamped on them. To enter or leave the



hot arcs get the point Quick!

Arcs burn with terrific heat when they leap between opening contacts. The heavier the load... the hotter they burn. Switch contacts get badly pitted and burnt, unless the arc is both controlled and extinguished, *quick*.

Westinghouse Safety Switches eliminate this source of trouble. The diamond-pointed jaw carries the arc outside the contact area assuring long contact life.

On Safety Switches, 575 and 600 volts, Westinghouse adds another protective plus—the "De-ion" arc quencher. This exclusive feature draws the arc up into the grids—divides and extinguishes it in the blink of an eye.

These advantages mean better, more dependable protection. Contacts stay clean, last longer. Time-outs for maintenance and inspection reduced.

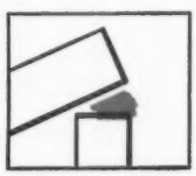
Protect your important circuits with Westinghouse Safety Switches. Ratings up to 1200 amps, 600 volts. Call your Westinghouse representative today. Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa., Dept. 7-N.

J-21266

LIKE THIS

Diamond-pointed break jaws confine arcing to the point... force the arc to break outside the current carrying areas. Contact surfaces stay clean, don't pit and burn.

NOT LIKE THIS



When ordinary safety switches are opened, the arc leaps across the contact areas . . . along the jaw and blade. It hangs on longer, burns and pits the contact surfaces.

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

SAFETY SWITCHES

DESIGN

in Construction makes these Compressors the "Lightweight Champions" of the World

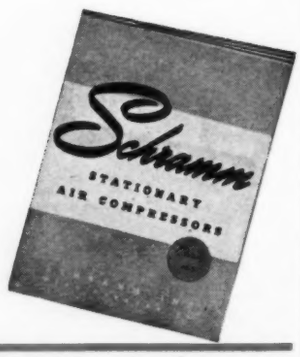
Without sacrificing an ounce of pressure or a day of hard-hitting useful life Schramm gives you a compressor with a weight saving up to 40%. . . . Take a look at the straight-in-line vertical cylinders, cast en-bloc—a compact arrangement that makes for streamlining and releases critical materials which are so badly needed in our present crisis. So, for any job that requires compressed air for Pneumatic Tools, specify Schramm—the Lightweight Champion that can step out of its class and take on the toughest of them.

If you want facts and figures on the complete line-up of Schramm Portable and Stationary Compressors, *Write Today for Our Interesting Catalog 42-S—They're FREE.*

SCHRAMM

THE COMPRESSOR PEOPLE

WEST CHESTER, PENNA.

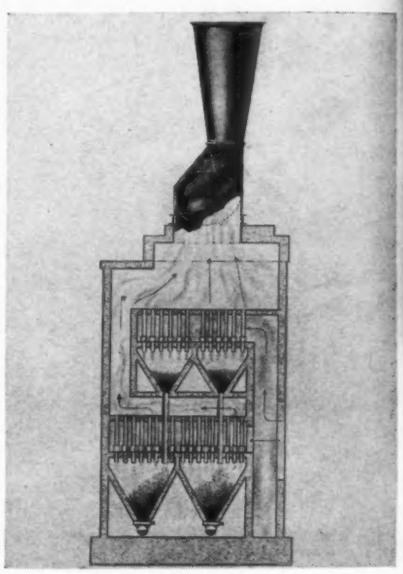


STATIONARY . . "V" OR FLAT BELT DRIVE . . "BUILT-IN" MOTOR DRIVE . . 50 TO 600 CU. FT.

plant, he deposits one of his numbered checks in the turnstile located at the plant entrance. When the check is dropped, it unlocks the turnstile and automatically records the employee as he goes through. At starting time, a guard closes the stile and late-comers are admitted through a manually controlled turnstile. The checks, collected in a locked compartment of the turnstile, are removed and the time records made of employees. Perey Turnstile Co., 101 Park Ave., New York.

Ceramic Tubes for Dust Collectors

Tubes of special fire clay are used in the Thermix ceramic tubular dust collectors. These tubes are claimed to be sufficiently thick and rugged to be proof against fracture and breakage, yet are light in weight. Made of hard, abrasive-resisting clay, they are mounted in a concrete or brick casing above concrete bins. Prat-Daniel Corp., Port Chester, N. Y.



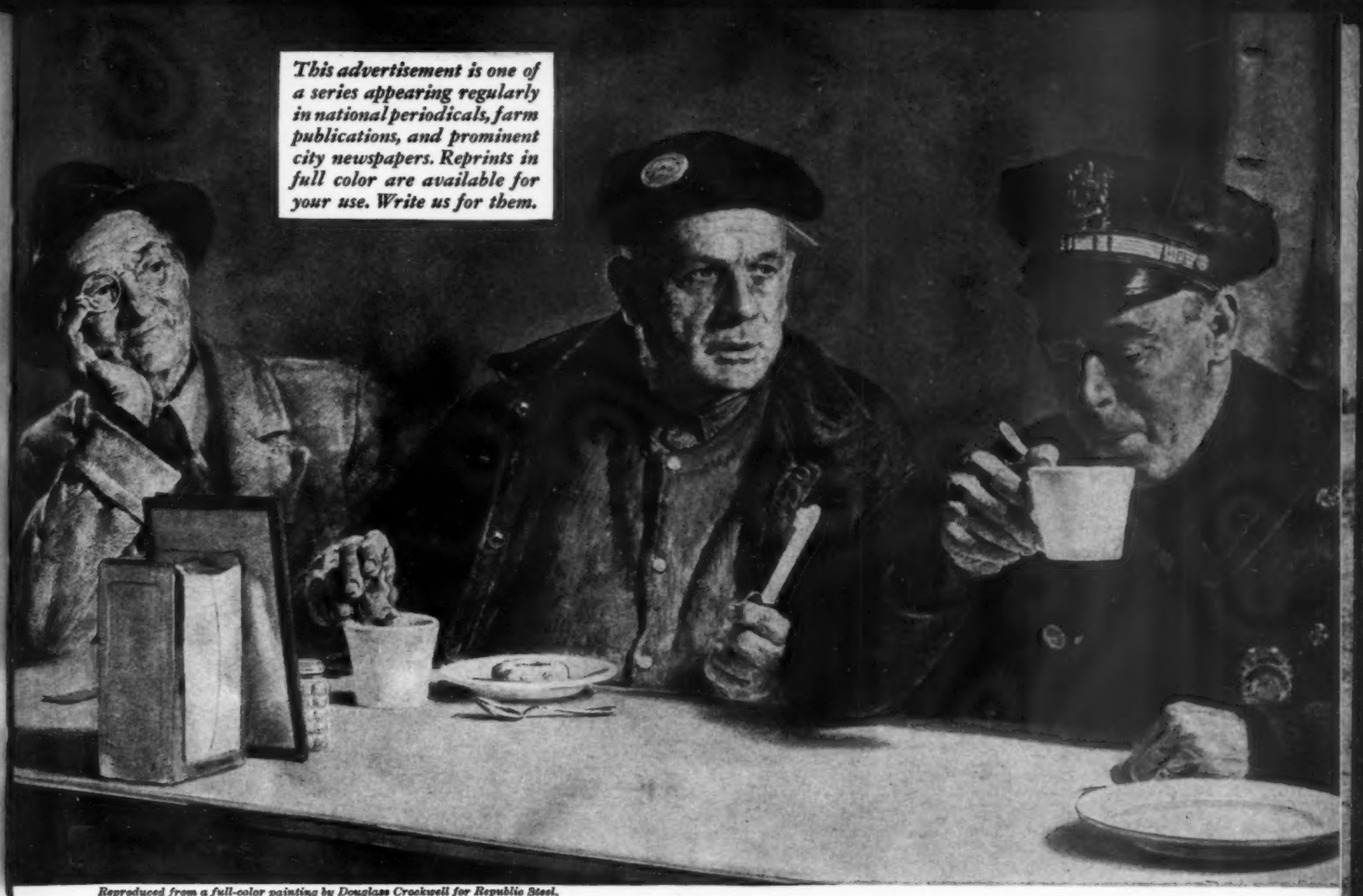
Fluorescent Inspection Light

Adapting the shape of the fluorescent lamp, this portable light has been designed for inspection in hard-to-see places. It is made of plastic. Removal of two screws takes it apart for lamp replacement. A combination metal light baffle and support shields the inspector's eyes from the light. Standard cord plug and ballast box with 20-ft. cord complete the equipment. Commercial Reflector & Mfg. Co., 3109 Maple Ave., Los Angeles.

Lift-Tilting-Fork Truck

Only 98 inches from the 30-in. fork tip to stern, this bantam-sized telescopic materials handling truck has been designed to navigate narrow aisles and in close quarters. With a single fork height lift of 71½ inches and additional telescopic lift reaching to 129 inches, truck model KM30–2 moves tiers, stacks, and stores ceiling high. Center controlled, it has

This advertisement is one of a series appearing regularly in national periodicals, farm publications, and prominent city newspapers. Reprints in full color are available for your use. Write us for them.



Reproduced from a full-color painting by Douglass Crockwell for Republic Steel.

"Now . . . if I was down there in Washington . . ."

That's Joe talking. Every night when he stops in for his coffee and sinkers he has plenty to tell the boys about how this war should be run. Maybe he's right and maybe he isn't.

The important thing is that he can say what he thinks—out loud. Right in front of Tom Burke, the cop. He couldn't do that in Germany or Japan or Italy . . . or in any of the nations that have been "liberated" by the New Order.

But Joe is an American.

★ ★ ★

And because Joe is an American, he has more privileges—*and more opportunities*—than can be found anywhere else in the world.

If he doesn't want to work for somebody else, he can operate a business of his own—anywhere. Joe is a free agent. His future is under his hat. Like millions of other Americans on the way up, Joe can cash in on a way of life that has brought America the highest standards of living in the world—by a big margin.

It is a typically *American* way of life—based on American ingenuity, ambition, desire to get ahead. It gives every person a chance.

That is why today, after a comparatively short time, teamwork and cooperation in American industry and American agriculture are performing miracles of production that would be impossible in a country weakened by years of regimentation and dictatorship.

That is why the steel industry—in which Republic holds a leading position—has been able to "come through" with the steels and steel products for our Nation's gigantic armament and shipbuilding programs. In 1942 Republic operated at 99.5% of capacity for the entire year. And the nearly 70,000 Republic men and women supporting our fighting forces* beat the 1941 record by 479,000 tons.

That, too, is why Republic chemists, metallurgists and engineers are constantly searching for—and finding—new and improved ways of making finer steels.

And that is why you can look with faith to the future—when victory will insure our *free* way of life—when you and we can return to the job we want to do most—produce peacetime products to make America a better, happier, safer place in which to live.

Until then, we have a big job to do. LET'S DO IT WELL and get it finished in a hurry. And let's guard faithfully our American way of life!

**Over 13,000 Republic men are now in uniform.*

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N.Y.

Republic

UPSON BOLTS, NUTS AND RIVETS

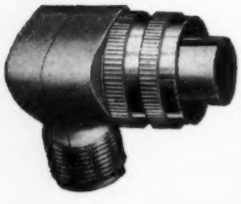
Pipe, Sheets, Plates, Enduro Stainless Steel, Union Cold Drawn Steels, Electrunite Boiler and Condenser Tubes.

YOU CAN SEE I'M AT THE OFFICE, DEAR!...

TELEVISION in some practical form will undoubtedly be the next big fact of our post-war lives . . . supplementing or possibly supplanting the radio.

Whether friend husband can participate in night life, while retaining the atmosphere of the office, and get away with it, is interesting to speculate upon. Even without this particular, and somewhat wistful application, there will still be plenty of interesting features about television.

Since television in all its forms will be of an electrical nature, Cannon Connectors will be important to the many specialized phases of this future industry.



Special vibration-proof electrical connector for the propeller feathering governor on an airplane. It is designed for use where the going is tough . . . and that applies to a lot of places where Cannon Connectors are used. In tanks, planes, railroad cars, ships, submarines . . . wherever electrical connections must be made quickly and with 100% dependability. Cannon Connectors are considered vital.

CANNON ELECTRIC

CANNON ELECTRIC

Cannon Electric Development Co., Los Angeles, Calif.

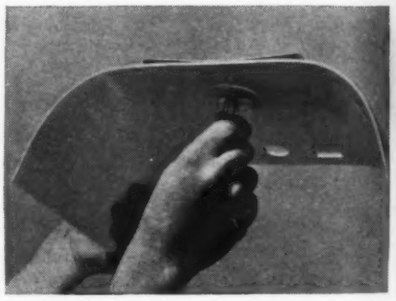
Canadian Factory and Engineering Office: Cannon Electric Co., Ltd., Toronto

REPRESENTATIVES IN PRINCIPAL CITIES — CONSULT YOUR LOCAL TELEPHONE BOOK

four speeds forward and reverse. The hoisting and tilting controls are fitted with mechanical limit safety stops. Claimed to handle up to 2000-lb. loads. Yale & Towne Mfg. Co., Philadelphia.

Reflector Latch

A spring-type fastening, called Captive Latch, holds composition reflectors securely to the top housing. The latch

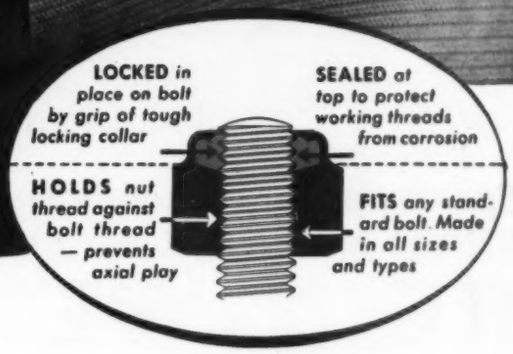


requires only a quarter turn to remove the reflector, is inconspicuous, and requires no tools. An integral part of the top housing, it cannot become loose and drop out. Sylvania Electric Products, Inc., Lighting Div., Salem, Mass.

Air-Cooled Transformer

Air-cooled power distribution transformer is constructed throughout with class B insulation. Light and compact, it is easy to install and requires small floor space. Needs no headroom. Can be furnished

THESE ARE THE NUTS FOR TOUGH JOBS


LOCKED in place on bolt by grip of tough locking collar
SEALED at top to protect working threads from corrosion
HOLDS nut thread against bolt thread — prevents axial play
FITS any standard bolt. Made in all sizes and types

●War jobs have posed infinite production problems.

We know a lot of them that were solved with as simple a thing as a nut.

Because the solution was an Elastic Stop Nut.

For example, aircraft. Their very worth depends upon fastenings that grip sure and won't shake loose under the chatter of machine guns, the impact of cannon fire and the vibration of air combat.

Every plane streaming off America's production lines has Elastic Stop Nuts fastening important structural parts. Several millions of them go into aircraft every day.

And to our knowledge, not one has ever failed to do its job.

With two big plants running full-tilt 24 hours a day, we can't satisfy all the needs of today's one big customer.

But in the days ahead, with Elastic Stop Nuts generally available, peacetime products and their production are going to be better.

And our engineers schooled in solving the rigorous problems of war production will be at the service of manufacturers with fastening requirements.

Whenever you wish, they will be ready to share their knowledge with you and recommend the desirable Elastic Stop Nut.

ELASTIC STOP NUTS

Lock fast to make things last

ELASTIC STOP NUT CORPORATION OF AMERICA
UNION, NEW JERSEY

ESNA TRADE MARK

Dual Operation of Two Speed Pumps

contribute to fast and easy operation

Model 30.11A
. . . 30 ton
capacity

Speed up war production jobs involving lifting, pressing, bending, etc. - - with

HEIN-WERNER HYDRAULIC JACKS

If your factory is doing war work—you can lick many production problems by utilizing Hein-Werner Hydraulic Jacks. They are great for moving or lifting machinery, heavy materials, etc., and can also be used for pressing and bending operations.

Model 30.11A (illustrated) is unusually fast and easy operating. In the initial operation, the jack handle is extended through the handle sockets of both the *high speed pump* and the *high pressure pump*, thus giving the combined displacement of both pumps to attain *maximum speed*. If and when the pumping becomes an effort for the operator, he simply pulls the handle back out of the handle socket of the high speed pump, (thus disengaging the high speed pump)—and he finishes lifting the load by utilizing only the high pressure pump which operates at slower speed and minimum effort.

For full details on Model 30.11A, as well as on 3, 5, 8, 12 and 20 ton models, consult your industrial supply distributor, or write us.

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

HEIN-WERNER HYDRAULIC JACKS
Are Built Right and Priced Right

up to 500 kva. in voltages to 4800 volts, single-phase, three-phase, and Scott connected three- to two-phase or two- to three-phase in one unit. Eisler Engineering Co., 740–770 South 13th St., Newark.

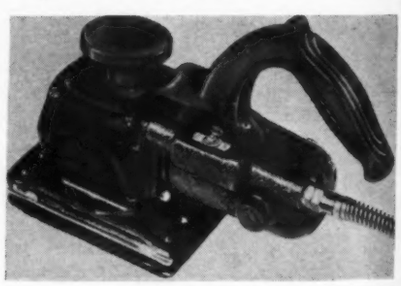
Welders' Safety Goggles

Eye-protection glass for welders has been announced. Noviweld-Didymium safety goggle lenses are said to cut down the sodium rays of the fluxes, thus enabling

the welder to see through yellow flame and at the same time protecting his eyes from the glare of invisible ultra-violet and infra-red rays. Manufactured under laboratory control, three shades of lenses are available. American Optical Co., Southbridge, Mass.

Reciprocating Sander

Even inexperienced women workers can easily handle the Model R. sander on finishing jobs. Equipped with hand grips,



the balanced weight allows even pressure on the work with only guidance necessary from the operator. Has a reciprocating action of 3000 oscillations per minute. Comes equipped ready to plug in. Lintern Corp., Nedco Div., 44 Lincoln Ave., Berea, Ohio.

Double-Circuit Light

A double-circuit portable fluorescent light has receptacles for plugging in small power tools and additional fixtures. As many as four lights can be connected in line to a maximum of 60 feet from a single outlet, according to the manufacturer. A 24-in. unit containing two 20-watt lamps and a 48-in. unit with two 40-watt lamps are available for 50- or 60-cycle current. Units are high power factor. Brackets for hanging and a hinged wire lamp guard

PHOTO BY U. S. ARMY SIGNAL CORPS

OSTUCO "rides the dusty trails" with our mechanized Army

OUR all out Army is heading Hitler-wards on wheels because this war won't wait for movements afoot. Thousands of rugged American trucks transport men and materials over roads that are more often by-ways than highways.

In many of these military trucks, weight support and resistance to gruelling jolts and jars are supplied by parts made from OSTUCO seamless steel tubing. Among those parts are axles, propeller shafts and bearings, piston pins, washers and sleeves. For each application OSTUCO provides seamless steel tubing that meets strict military specifications—tubing that's straight, sound, clean, and free from pits, scores, and other surface imperfections.

Thus OSTUCO now draws on its years of experience to provide seamless tubing that fills the need for strength, hardness, accuracy as to size and gauge, and machinability to help solve vital wartime manufacturing problems. At the same time it is gaining a wealth of new experience to help you meet the new and equally strict demands of competitive, peacetime mass production.

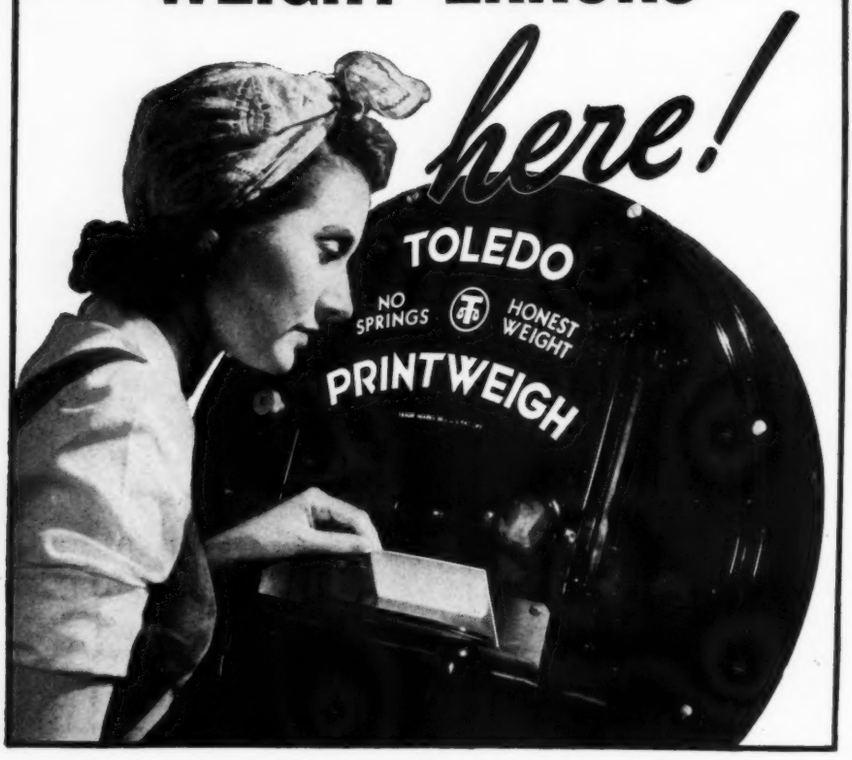
BUY MORE U. S. WAR BONDS • PUT ALL YOUR SCRAP INTO THE FIGHT

THE OHIO SEAMLESS TUBE COMPANY

SHELBY OSTUCO OHIO

GREEN HELP

CAN'T MAKE COSTLY WEIGHT ERRORS



● Today's tough production-control job—dealing with new workers, long hours, greater fatigue and wartime speed—has brought more and more demands for TOLEDO PRINTWEIGH... to *keep weight records straight*... and set the job down right and fast! Adaptable to scores of weighing operations in all types of industries. Write for Bulletin No. 2032. Toledo Scale Company, Toledo, Ohio. Sales and Service in 181 cities.

NO OTHER WEIGHING MACHINE LIKE THIS!

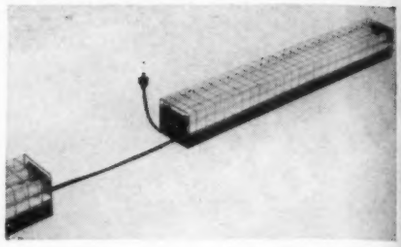
IT *PRINTS* WEIGHTS *FAST!* Toledo Printweigh puts *accurate, printed* weight records in the operator's hand with split-second speed!

IT PRINTS *BIG* FIGURES... *unmistakably big*...on thick tickets...on large or small sheets...on strips...with extra copies.

IT'S *SIMPLE* IN OPERATION! Prints *direct*...no complicated mechanism...*dependable*...operates in as little as 3/5 sec.

IT'S ACCURATE! Back of Printweigh are more than 20 years of Toledo Research and Engineering in weight-printing. Printweigh performance has been thoroughly proved throughout industry.

TOLEDO PRINTWEIGH SCALES



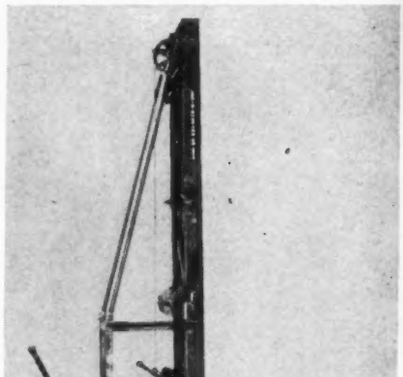
are standard equipment. Twistlock fittings on the plug and receptacle are available. Lumidor Mfg. Co., 3120 East Pico Blvd., Los Angeles.

Water Paint

Techide, flat wall water paint, can be applied with an ordinary calcimine brush on plaster, wallboard, old painted surfaces, cement, brick, and casein-painted surfaces. It is said to dry in one hour and permit a second coat in three hours. Coverage ranges from 400 to 1000 square feet per gallon, depending on the surface to be painted. Paint is claimed washable. Available in ivory, gray, white, and pastel colors. Pittsburgh Plate Glass Co., Grant Bldg., Pittsburgh.

Portable Elevator

The air Power Stacker offers safety in explosive atmospheres, it is claimed. Powered by an air motor, the stacker operates at the same air pressure and volume as



industrial overhead air hoists. A "dead man" cable control stops the air motor and stacker platform when the operator lifts his hand from the dual holdover control. Precise control makes any speed of lifting or lowering between the maximum top speed and zero obtainable. Limit controls prevent override. Lewis-Shepard Sales Corp., 600 Walnut St., Watertown, Mass.

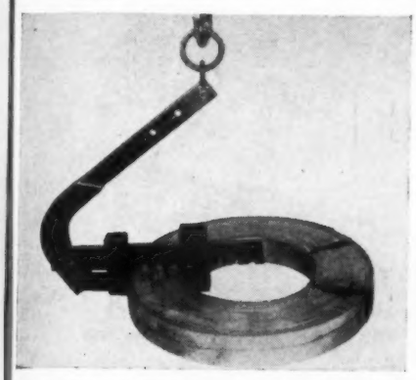
Emergency Signs

Emergency signs for indoor and outdoor use, designed in accordance with specifications issued by U. S. Office of Civilian Defense, are now available. The indoor

style is made of cardboard, the outdoor style of a heavy asphalt-treated base board coated with a high-gloss waterproofing finish. Color combination is white lettering on a black background. Luminescent lettering that glows in the dark after exposure to light is available for both indoor and outdoor signs. Size 12x20 inches. Cardy-Lundmark Co., 1801 Byron St., Chicago.

Lifting Device

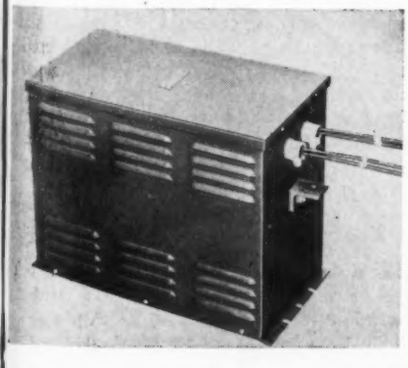
A lifting device for handling coils of strip has been added to the materials handling equipment line. Readily adjustable for a wide range of coil sizes, it handles coils



in a horizontal position. No part of the lifter is underneath the coil. Non-magnetic, the lifter can handle brass, copper, aluminum, or steel. It can be used on any crane or hoist without special equipment. Never-Slip Safety Clamp Co., 827 Mamaroneck Ave., Mamaroneck, N. Y.

Voltage Stabilizer

A voltage stabilizer that provides a constant output of 115 volts from circuits varying between 95 and 130 volts has been announced. The stabilizer is claimed to be insensitive to load power factor, and not affected by variations from no load to full load, or by changes in power factor



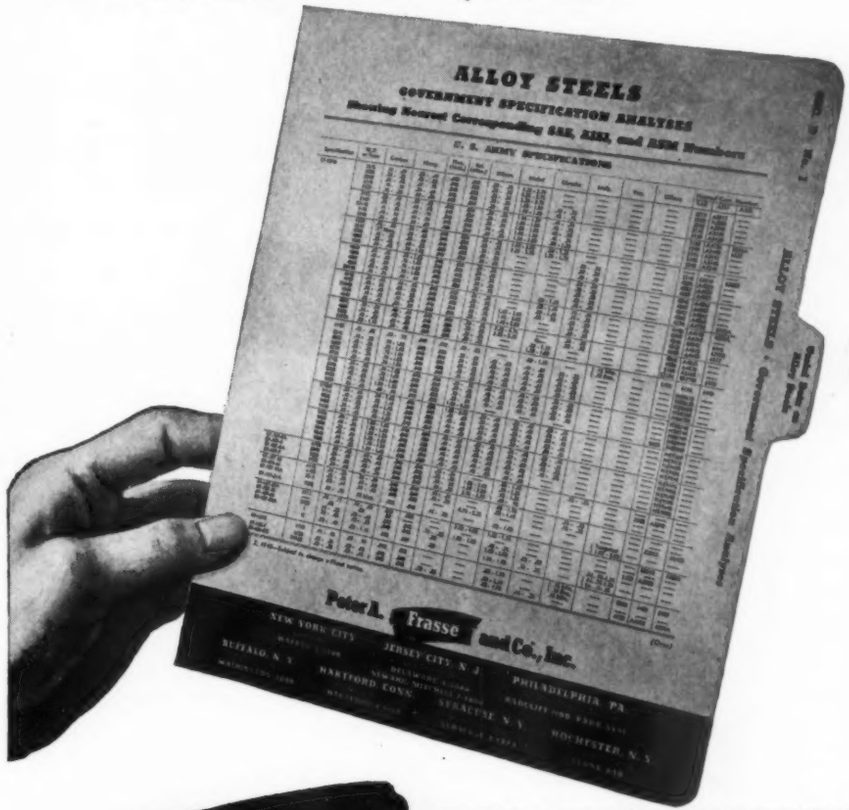
NEW GOVERNMENT "SPECS" for ALLOY STEELS!

Revised Frasse Data Chart Now Available...

Incorporating all recent additions, this new Frasse Data Chart enables you to identify latest Government "specs" for alloy steels at a glance.

It shows the chemical analysis requirements for each Army, Navy, and Federal specification, together with its nearest commercial equivalent in SAE, AISI, and AMS numbers. Government "specs" for the new NE steels are included.

The chart is handy file size, printed on tough stock, and suitable for wall or desk use. If you're working to Government "specs," you'll find it invaluable. Just send in the coupon—a copy will be sent to you by return mail.



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Mechanical and Aircraft STEELS

PETER A. FRASSE & CO., Inc. 13
Grand St. at Sixth Ave
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Please send me a copy of your latest Frasse Data Chart, Section D, No. 1, showing Government "specs" for alloy steels and corresponding commercial designations.

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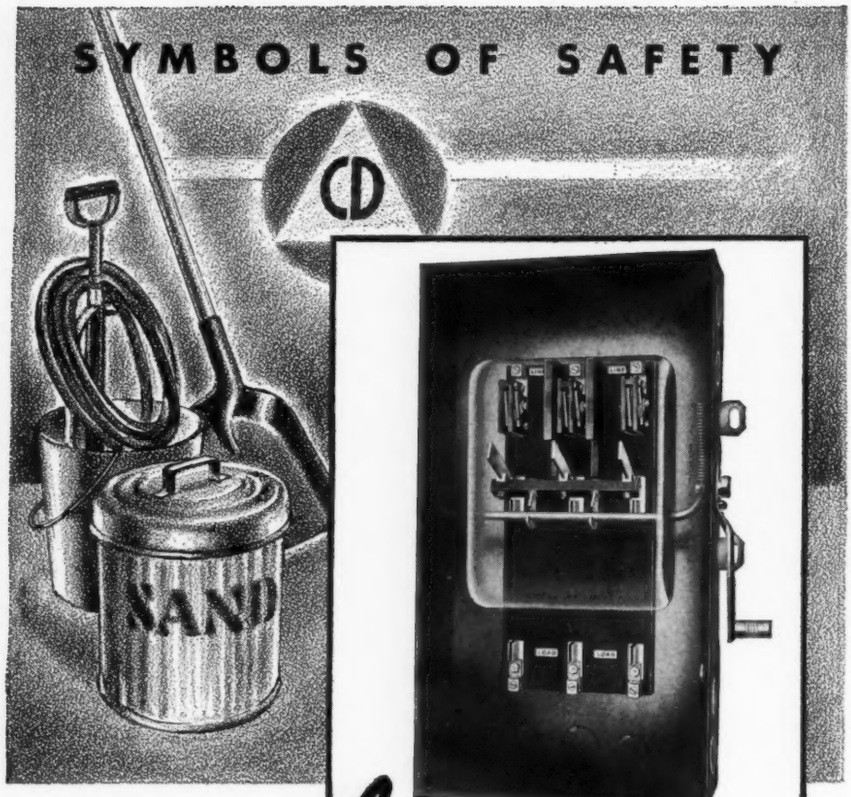
ALLOY STEELS • AIRCRAFT STEELS • STAINLESS STEELS AND TUBING
DRILL ROD • COLD ROLLED STRIP AND SHEETS • WELDED STEEL TUBING



Federal Rolarc SAFETY FACTORS

PREVENT MANPOWER SHORTAGES

Industrial accidents are one reason for manpower shortages. And uncontrolled arcing is one cause of industrial accidents. That's why special safety features are incorporated in Federal Rolarc Safety Switches to control and reduce dangerous arcing to an *absolute minimum* . . . and to increase production by eliminating delays and accidents caused by switch failure.

The parallel cylindrical rollers which "dam up" and snuff the arc give these 575 Volt Rolarc Safety Switches many added advantages. This new method of arc control lengthens switch life — conserves war vital copper — saves valuable time and priceless manpower. Follow the leaders — for extra service and safety switch to Federal!

For Complete Rolarc Data

Write for Bulletin 42-12. Contains all the essential facts on the 575 Volt Federal Rolarc Safety Switch.

FEDERAL ELECTRIC PRODUCTS COMPANY

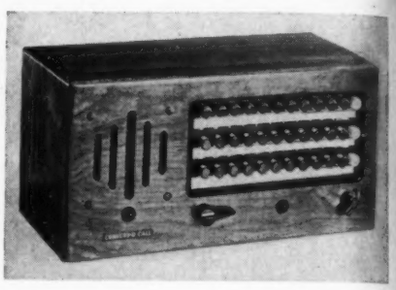
58 PARIS STREET, NEWARK, N. J.

PANELBOARDS • SWITCHBOARDS • SAFETY SWITCHES • CIRCUIT BREAKERS

from unity to 0.8 lagging. It is self-protecting, and will operate continuously throughout the range from open circuit to short circuit without damage. Ratings from 50 to 5000 volt amperes are available. General Electric Co., Schenectady.

Intercommunication System

Whether paging throughout the plant or privately calling from department to department, Convers-O-Call provides a combination all-master system which facilitates



factory and office intercommunication. There are no switches to push while talking. Voice transmission is claimed to be clear and distinct. Calls go through even if the power of the station called is turned off. Available for 10 to 30 stations. Earphones may be had if desired. Fred E. Garner Co., 53 E. Ohio St., Chicago.

Extension Fork Adaptors

Quickly and easily attached, fork extension adaptors permit more flexible lift truck operation with standard models. With the adaptors, fork lengths can be extended safely as much as 24 inches in a few seconds, it is claimed. Inserted by

slipping the eye at the bottom of the adaptor over the forks, the adaptor is slid back to the bend of the forks and lowered, thus locking into position. Skids or pallets need not conform to a minimum size range to be accommodated by the same lift truck when adaptors are used. Towmotor Co., 1226 E. 152nd St., Cleveland.

Printer

Half a minute makes a blueprint or black and white print on the Spee-Dee printer, according to the manufacturer. A portable table model, it can be plugged into a

Technically-informed supplier of electronic materials . . .

BUY U.S. WAR BONDS

Your local RCA TUBE and EQUIPMENT DISTRIBUTOR

'ROUND-THE-CORNER SERVICE!

Following are but a few of the electronic items regularly handled by your local RCA Tube and Equipment Distributor:

RCA, CUNNINGHAM, and RCA VICTOR RADIO TUBES

RCA SPECIAL PURPOSE TUBES

RCA POWER TUBES, PHOTOTUBES, CATHODE RAY TUBES, etc.

RCA ELECTRONIC TEST EQUIPMENT

. . . also condensers, resistors, rheostats, controls, potentiometers, coils, transformers, wire, and numerous other radio and electronic components produced by many manufacturers.

Making war equipment that necessitates frequent calls for tubes and other electronic components?

Then get acquainted with your *local* RCA Tube and Equipment Distributor today!

He may have just what you need in stock for immediate delivery upon receipt of a suitable priority. If he doesn't, he is well equipped to get it for you as fast as circumstances permit—and to render an intelligent, personalized expediting service all along the line.

Equally important is his technical knowledge. He has been dealing with things electronic since the "knee pants" days of radio. He knows what to use and how to use it. You'll find his technical advice and recommendations a big help.

There are over 300 RCA Tube and Equipment Distributors throughout the country. Write or wire for a list of those nearest you.

RADIO CORPORATION OF AMERICA
RCA Victor Division, Camden, N.J.

AN ADVERTISEMENT OF THE RCA TUBE AND EQUIPMENT DIVISION IN THE INTEREST OF GREATER SERVICE AND EFFICIENCY IN PRIORITY-COVERED WAR MATERIALS BUYING

New low-priced duplicating masters made of paper now open the way to many new uses for existing Multilith Equipment.
DUPLIMATS GIVE CLEAR BLACK ON WHITE REPRODUCTIONS, WITH OTHER COLOR COMBINATIONS AS DESIRED. THEY ASSURE PERMANENCE AND LEGIBILITY ON A WIDE VARIETY OF PAPER STOCKS.
Easily adapted to your present systems and procedures—
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Simple, quick, economical—and every copy is an actual facsimile of the master.

In addition to the use of these new DUPLIMATS, there are other ways to increase the services of your Multilith and Multigraph equipment. For more ideas, send for a trained Multigraph representative. Call or write nearest Agency, or write—

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standard electric outlet. Printing on curved glass surface gives the contact Duplicates tracings, drawings, letters, and other written or printed matter. Two sizes—for prints up to 12x18 and up to 18x24 inches. Actual printing surface is oversize to prevent crowding or overlapping edges. Peck & Harvey, 4325 Addison St., Chicago.

Cleaning Solvent

A solvent has been developed which is claimed to be faster than naphtha in cutting gummy and tarry dirt. The solvent is described as a volatile, water-white methalated hydrocarbon which evaporates clean, is noninflammable and nonexplosive. It is said to cause no corrosive or rusting tendency in ferrous metals. Curran Corp., 6 Pleasant St., Malden, Mass.

Level Control

Electronic level controls for hazardous location mounting are announced. The equipment is supplied for use with conductive liquids of an explosive nature. Two models, P15NHX and P15NLX are available for high and low lever control respectively. Each is furnished as a complete unit in a vaporproof cast-iron housing for direct tank installation. Mounted by 1-in. nipple screwed into a 1-in. flange on top of the tank. From the control, a probe rod projects through the nipple and into the tank to the desired depth. High level control is accomplished when liquid rises and contacts the probe tip; low level control, when liquid drops below the probe tip. Both models incorporate

LARGEST Buick automobile dealer in the world is the Glidden-Buick Company of New York. Over 8,000 new and used cars sold . . . 53,000 serviced . . . was the impressive total recorded by this firm in 1941.

Then—Pearl Harbor, and Glidden-Buick, like many other civilian business enterprises determined to find an active role in America's war effort. With the assistance of Air Reduction service engineers a study was made of the likeliest fields of activity, and plans were drawn up for conversion of Glidden-Buick's repair shops to essential war work.

Within three months, well equipped welding shops in Glidden-Buick's plant were producing aircraft parts for many important Eastern aviation manufacturers. Today, this typical American peacetime firm is turning out highly specialized aircraft assemblies in a steadily increasing volume. Employing a large staff of men and women welders, Glidden-Buick has now become one of the outstanding producers of vital aircraft parts.

In hundreds of cases specialized "know how" of Airco engineers, pooled with a customer's intimate knowledge of his problem, has speedily solved urgent manufacturing difficulties. This is in keeping with Air Reduction's established policy of providing maximum service to its customers in the application of oxyacetylene and electric arc processes. If you have any problems involving the use of these processes, communicate with your nearest Airco office.

Air Reduction

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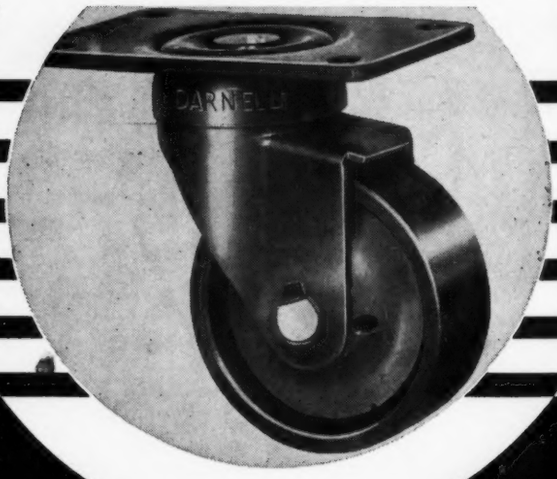
IN TEXAS
MAGNOLIA-AIRCO GAS PRODUCTS CO.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES

AIRCO WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em rolling for victory!*



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SAVE EQUIPMENT . . .
Floor wear is reduced to a minimum—costly floor replacements and repairing practically eliminated.

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No wracking of equipment due to stubborn, hard-to-roll casters. Darnell Casters "always swivel and roll."

SAVE TIME . . . . .
Speed up inter-departmental movement of products and materials . . . increase efficiency of employees.

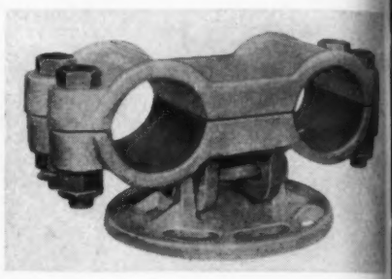
DARNELL CORP. LTD., 60 WALKER ST., NEW YORK, N.Y.
LONG BEACH, CALIFORNIA, 36 N. CLINTON, CHICAGO, ILL.

★ **FREE Manual FOR THE ASKING!** ★

safety feature providing for operation of the relay in case of current or tube failure. Available for operation on 230, 208, or 115 volts a.c., 60 cycles. Photoswitch, Inc., 21 Chestnut St., Cambridge, Mass.

Bus Support Clamps

Cast-to-size single or double bus support clamps are available with provisions for longitudinal movement of bus conductors due to expansion or contraction. Bus



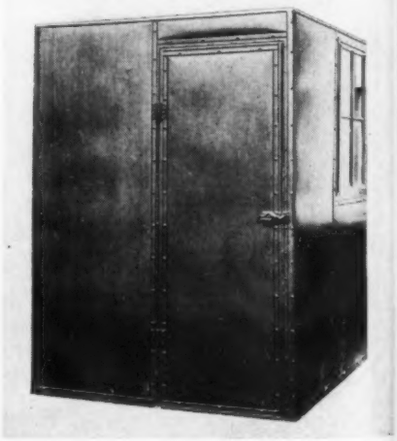
fittings have rollers permitting ⅜-in. longitudinal movement of bus on either side of center line or 1¼-in. total movement. Use of this sliding type of fitting reduces possibility of insulator breakage on long bus runs. Delta-Star Electric Co., 2400 Fulton St., Chicago.

Safety Helmets for Women

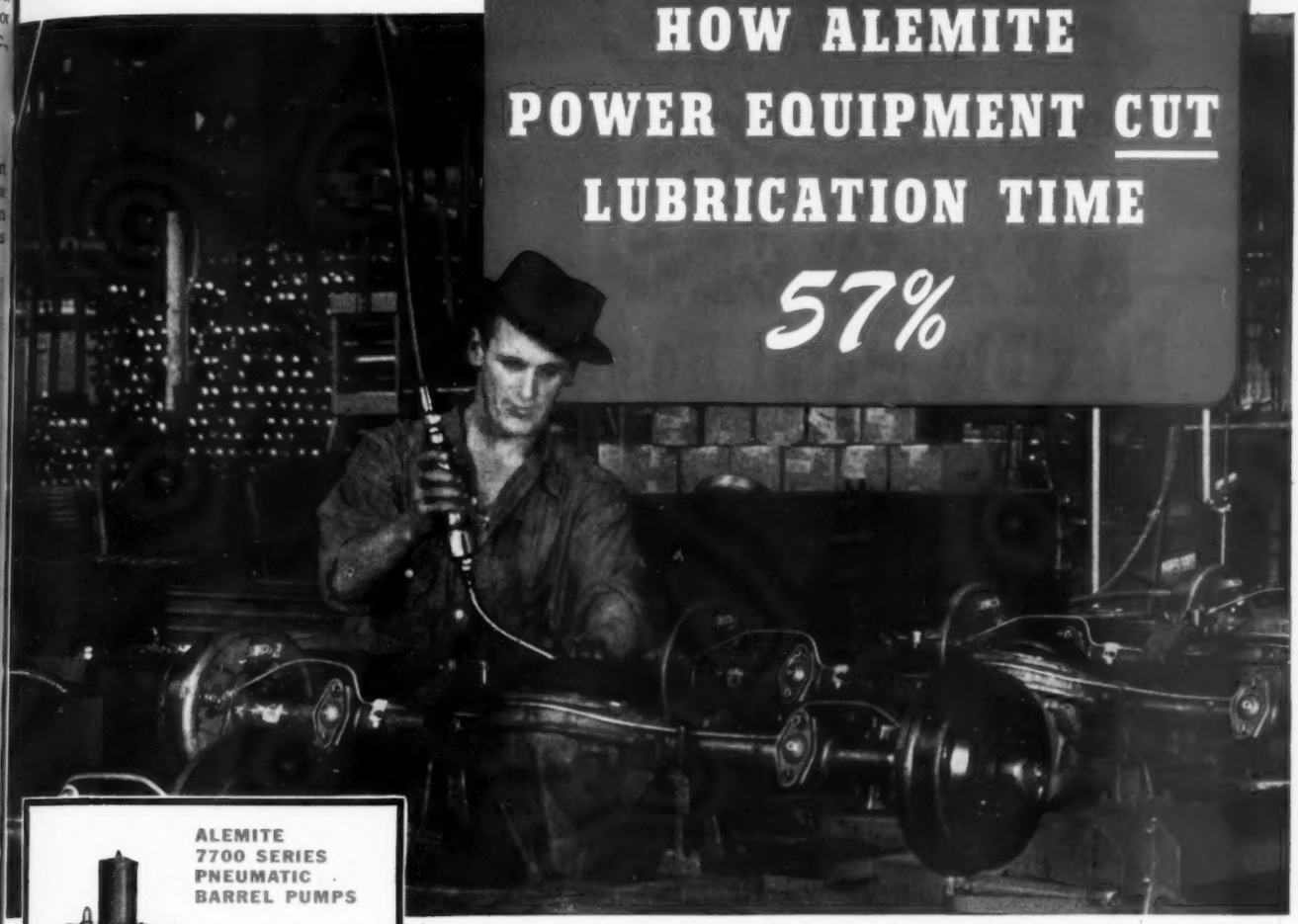
"Protector helmets" for women in the plant have been added to line of safety headgear. Molded from vulcanized fiber into a one-piece, seamless crown, they are light in weight. A hammock that rests directly upon the wearer's hair replaces the usual type of safety hat lining. An adjustable chin strap holds the helmet in place. Available in black or tan and in small and medium head sizes. Strauss Co., 875 Ewart Bldg., Liberty Ave., Pittsburgh.

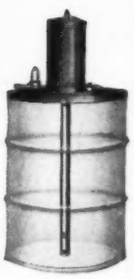
Prefabricated Building Material

Small industrial steel buildings that combine strength and utility can be quickly erected by unskilled workers with the use of prefabricated structure. Die-formed, the structure can be assembled or taken apart with simple wrenches. No welding or



HOW ALEMITE POWER EQUIPMENT CUT LUBRICATION TIME 57%





ALEMITE 7700 SERIES PNEUMATIC BARREL PUMPS

. . . comprise a complete range of heavy-duty pumps available for high or low pressures. Handle heavy greases direct from original drums; ample capacity to serve several outlets.

ALEMITE MODEL 6528 40-LB. PNEUMATIC GUN

. . . operates on 90 to 150 lbs. air; handles heavy fibrous grease; develops grease pressure 33 times air pressure used. Exclusive helix arm and worm assures positive prime; no air pockets.

ALEMITE MODEL 6190 25-LB. ELECTRIC GUN

. . . delivers 12 oz. light-bodied lubricant per minute; nitralloy high pressure piston and cylinder; heavy duty universal motor; complete with cord, hose and adapters.

Spurs Vital War Production and Guards Bearings in Countless Plants

EVERY manufacturer has his own lubrication problems. This one had to find a way to get four pounds of grease into a differential assembly —*fast.* Four pounds, no more, no less. It required 35 seconds, and that seemed fast. Then Alemite Power Equipment was put on the job, and that 35-second operation was done in 15 seconds. That amounts to a 57% saving in lubrication time!

This is not an isolated case. Alemite Lubrication has been making savings like that for industry over a long period of years. But those savings were never so important as now—when minutes saved can so easily be translated into lives saved—when bearing failures avoided can be translated into defeats avoided.

Alemite Power Lubrication Equipment is made in models to fit large or small operations. It is ruggedly built to stand up for years under severest conditions. Wherever possible, present Alemite Equipment should be repaired, worn parts replaced, to keep it at top efficiency. New Alemite Equipment is available on priority order. Both new guns and repair parts are shown in the latest catalog of Alemite Industrial Lubrication Equipment, sent FREE on request.

Ask Anyone in Industry!

Another Product of STEWART WARNER

ALEMITE

REG. U.S. PAT. OFF.

Industrial **LUBRICATION**

1870 Diversey Parkway, Chicago, Ill. • Belleville, Ontario

FLEXPEDITE

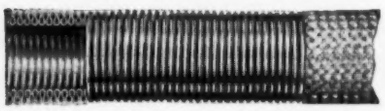
Your Conversion—Assembly—Production

with

REX-WELD

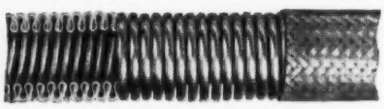
Flexible Metal Hose

Rex-Weld Hose—Annular Corrugations



RW-80 Unbraided ——— RW-81 Braided

Rex-Weld Hose—Helical Corrugations



RW-90 Unbraided ——— RW-91 Braided

General Data

	STEEL	BRONZE
Sizes	To 4" I.D.	To 4" I.D.
Pressures	To 14,500 p.s.i.	To 14,500 p.s.i.
Temperatures	To 1000° F	To 450° F.
Lengths	To 50′	To 50′

Use Chart

	*STEEL	BRONZE
Saturated Steam		✓
Superheated Steam	✓	
Sulphur Bearing Oil	✓	
Oxygen		✓
Ammonia	✓	
Carbon Dioxide	✓	
Sulphur Bearing Grease	✓	
Critical Vibration		✓
Non-Sparking		✓

Protective Coatings Can Be Applied for Corrosion Protection (To Conserve Critical Copper Bearing Alloys).

Couplings: REX-TITE Mechanical (Re-attachable) Couplings; Solder Couplings; Brazed and Welded Couplings and Flange Assemblies for Rex-Weld Flexible Metal Hose.

Ask for Engineering Recommendations

CHICAGO METAL HOSE CORPORATION

General Offices: MAYWOOD, ILLINOIS

Factories: Maywood and Elgin, Ill.

riveting is required. Lightweight panel sheets of steel make a building which is easy to move. A watchman's hut, a housing place for equipment, processing rooms, cold storage rooms, industrial dryers, and other small buildings can be easily erected for quick, temporary use. Lindsay & Lindsay, 222 West Adams St., Chicago.

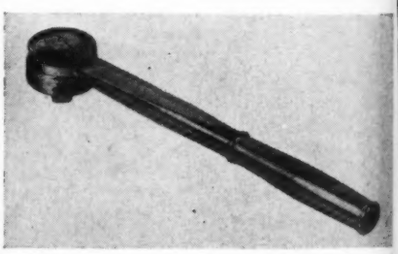
Work Illuminators

A line of industrial work illuminators, magnifiers, and inspection units facilitates difficult operation on small parts and in inaccessible places. Different types of spe-

cialized electric lamps are available for localized illumination. Models are offered for permanent or portable application and are equipped with soft, glareless Verd-A-Ray lamps. Acro Tool & Die Works, Dept. M, 5324 N. Kedzie St., Chicago.

Socket Wrench

A socket wrench known as the Wedge-Lock has no ratchet to limit movement. Two hardened steel free-moving shoes serve as an instantaneous clutch. At the point the handle comes to a stop on the back swing, the wrench is locked for the tightening pull. The minimum return mo-

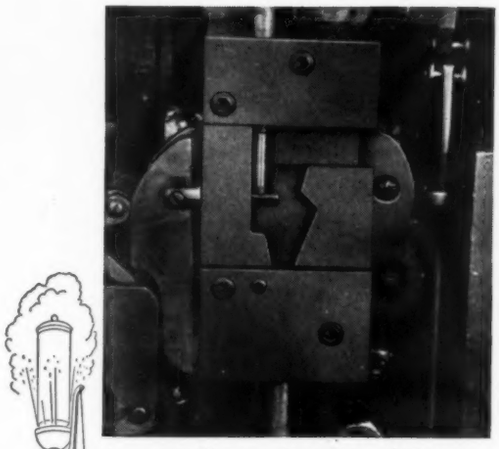


tion before engaging is 1.2 degrees clockwise or counterclockwise. A handle movement of $\frac{1}{16}$ inch or less makes the wrench usable in close quarters, the manufacturers claim. Available in $\frac{1}{4}$-, $\frac{3}{8}$-, $\frac{1}{2}$-, and $\frac{3}{4}$-in. sizes. F & H Mfg. Co., 2207 W. Jefferson St., Los Angeles.

Fiberboard Lockers

Fabricated from pressed hard fiberboard, wartime locker compartments, although not completely waterproof or fireproof, offer protection from moisture and dirt. An olive green lacquer finish gives a hard surface which is easy to clean. Rabbeted connections reinforced with angle braces add rigidity and strength to the structure. Easily assembled, installations can be furnished for from 10 to

better Methods with mechanical fingers



A connecting link assembly machine which replaces human fingers and eliminates the possibility of error.

Machine designers have done amazing things in multiplying power and speed. Even more astonishing are their achievements in creating machine assemblies which perform work that previously only human fingers could do. Baldwin-Duckworth engineers, in constantly striving to give industry the finest roller chain belts for power transmission and conveying tasks, have themselves designed outstanding machines to make them. This connecting link assembly machine, for example, completely replaces hand-sorting of non-symmetrical pins having a tenon at one end and a cotter pin hole in the other. Its mechanical "fingers" turn end-for-end, and place the pins correctly as they come from the hopper, eliminate all possibility of error, and assure a uniformly assembled finished product.

better Drives with Baldwin Roller Chain Belts

Roller chain belts provide better solutions for many drive problems. It is equally true that *better* roller chain belts give even better drives. This fact lends meaning to the precision methods of Baldwin manufacture. It accounts for the unfailing dependability, the split-second timing, jerk-free smoothness and virtually 100% efficiency which characterize Baldwin drives. It is worth remembering, too, that *chain belts are the only medium of power transmission that can absorb shock loading without loss of speed ratios or efficiency.*

Your Baldwin-Duckworth catalog will give you data on standard applications of chain belts, and for specialized applications a Baldwin man will supply any information you may require. He will be glad to work with you on transmission or conveying operations of any machine which you may now be designing or which needs greater drive efficiency. Baldwin-Duckworth Division of Chain Belt Company, 327 Plainfield St., Springfield, Mass.

EXAMPLE

This cleaning and plating machine is entirely automatic and operates continuously over long periods of time. It depends upon Baldwin Roller Chain Belts for:

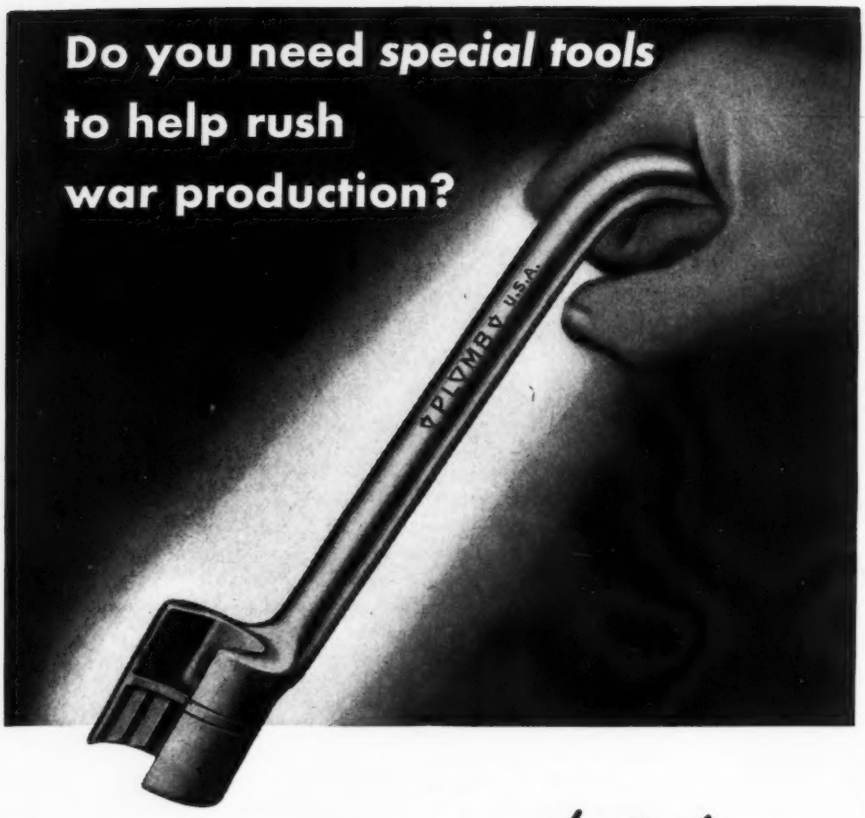
1. Split-second timing
2. Continuous, jerk-free smoothness
3. Virtually 100% efficiency

IT'S BALDWIN-EQUIPPED

better Drives through better Methods

BALDWIN

ROLLER CHAIN BELTS



PLOMB ENGINEERS *can help You*

Consult us for design and manufacture of special hand tools to reach the hard-to-get-at spots in your war production job. Plomb engineers have helped many manufacturers find the answers to their problems. They are ready to serve you... now or in the future.

Plomb dealers handle *regular* tools

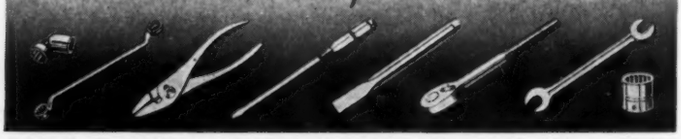
Throughout the nation Plomb dealers can supply you with regular Plomb hand tools of all types to meet your war needs. See the one in your locality for stock tools.

Facilities of 36 factories to serve you

To meet war demands for Plomb Tools, 33 sub-contracting companies help Plomb's own three factories make them. This makes possible a double service to you. See your Plomb dealer for *regular* hand tools... consult us for your *special* hand tool needs.

PLOMB

Fine Hand Tools for All Industries



PLOMB TOOLS CONTRACTING CO. *A Division of the*
PLOMB TOOL COMPANY
LOS ANGELES ▽ CALIFORNIA

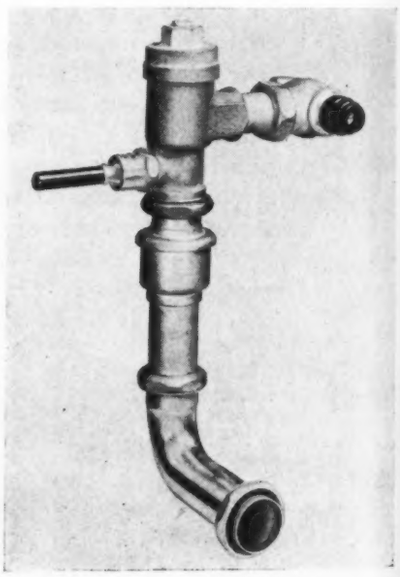
10,000 employees. Primary types available are single or double tier, single front; single tier, back to back; double tier, back to back. Sanymetal Products Co., Inc., 1705 Urbana Rd., Cleveland.

Portable Floodlight

Wide utility is claimed for this portable floodlight. The assembly is adjustable in a vertical range from bottom to top of the 6-ft. pipe standard, at any angle horizontally, and at a 360-deg. radius. A cast-iron circular base 20 inches in diameter provides stable footing. Either 300- or 500-watt lamps can be accommodated, and clear convex or stippled convex diffusing heat-resistant lenses are available. The 12-in. reflector is chromium plated for high reflecting efficiency. Steber Mfg. Co., 2451 N. Sacramento Ave., Chicago.

Flush Valve

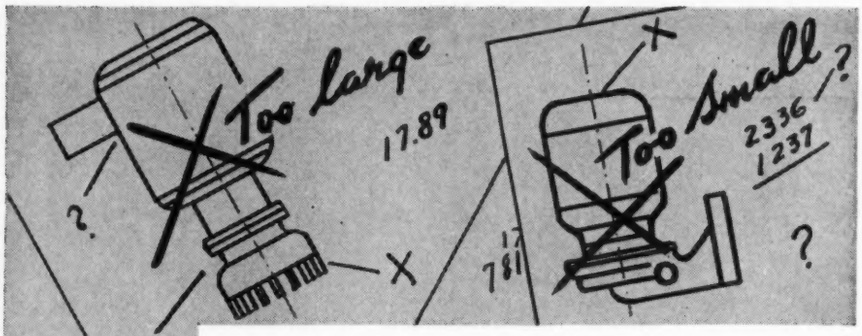
The wartime "V" model watrous flush valve conforms to material conservation requirements of government agencies, and can be furnished for essential wartime construction. Selected alternate materials replace brass and bronze parts, and a pro-



I.B. CRANES MEAN SPEED!

In America's fastest producing steel mills, shipyards, dry docks, and on the largest railroad lines Industrial Brownhoist Cranes are working hard and working fast to speed the United Nation's war production. I. B. Cranes are designed and built to stand continuous hard service at top speed. Their patented Monitor-type cabs insure 360° visibility, greater comfort and safety for the operator. For magnet, hook or bucket work it will pay you to operate I. B. Cranes. Industrial Brownhoist Corporation, Bay City, Michigan. District offices: New York, Philadelphia, Pittsburgh, Cleveland, Chicago.

INDUSTRIAL BROWNHOIST
BUILDS BETTER CRANES



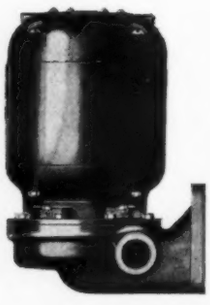
Select the most efficient
COOLANT PUMP
for that
Rebuilt Machine

Don't Waste Horsepower or Materials

Be sure it can deliver the maximum capacity for your requirements without compelling you to accept excessive horsepower to satisfy those requirements.

Pioneer Pumps provide maximum capacity with low horsepower; they conform to the order of the day by conserving vital metals and energy — and consequently release the extra horsepower and materials for other war production.

There is a Pioneer Pump to meet your exact requirements, for there are over 300 stock models available. We'll gladly help you select the right one for your particular needs.



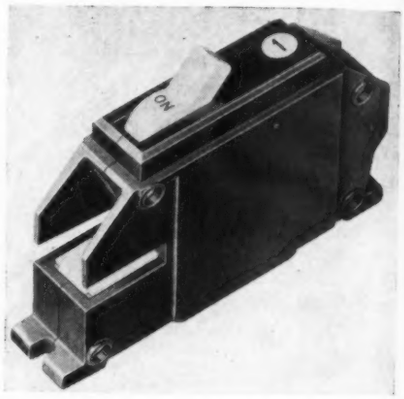
BUY WAR BONDS

PIONEER PUMP AND MANUFACTURING COMPANY
19651 JOHN R STREET · DETROIT, MICHIGAN

tective coating has been applied to parts subject to corrosion. Retains features of the peacetime valve. Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago.

Circuit Breaker

Improved a.c. Thermag circuit breaker with magnetic arc quencher combines the time-delay action of the thermal trip with the faster magnetic trip. When tripped, the handle on single pole breaker auto-



matically turns to "off" position. On the double pole breaker a red signal button protrudes from the face of the breaker on which the trouble occurs. Capacities: 50 amperes, 120 volts a.c., single or double pole, individual trip. Frank Adam Electric Co., 3652 Windsor Place, St. Louis.

Fiber Receptacles

Non-metallic tote trays, made of impregnated fiber, offer resistance to oil and water. They are said to be light in weight, tough, rigid, and resilient. Made in three standard sizes, the largest is 21¾x13¾x10 inches.

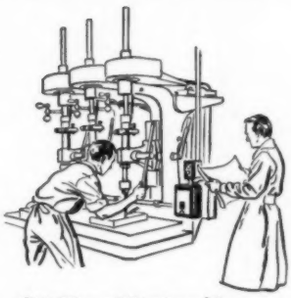
A fiber water-resistant, vermin-proof utility can of 20-gal. capacity is available also. Bursting strength is stated as 500 pounds per square inch. Seams are made with flat wire stitching. Can is provided with rope handles and an overlapping cover of fiber. Arvey Corp., 3462 N. Kimball Ave., Chicago.

Rotary Pump

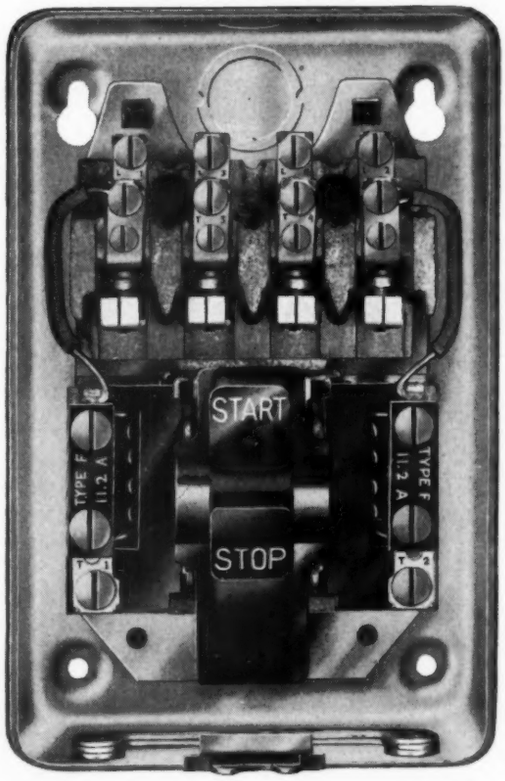
A removable liner is the feature of this rotary pump. By removing the pump heads, driving out the old liner, and inserting a new one, a worn pump can be back in operation in about half an hour. Neither piping nor drive is disturbed when liner is changed. Self-adjusting buckets

Be Sure with COLT *Engineered* CONTROLS

Above . . . *Colt "Protectit" — compact manual starters for small power units.*



Below . . . *Colt Manual Starter with automatic relatching mechanism.*



To those responsible for the performance of motor controls, Colt *Engineered* Controls offer . . .

Quality **— an accepted trait of all Colt products for more than 107 years.**

Performance **— the kind that lives through "starts" and "stops", loads and overloads, year after year.**

Standard and Custom-built Units **— a compact manual starter for a tiny fractional H.P. motor or a complete control panel for multi-motored machines.**

Call in an experienced Colt Engineer; from the complete line of Colt Industrial Controls he can recommend the equipment that exactly meets your needs.

PRODUCTION PARADE . . . . . COLT *Installations*

Colt Manual Starter on Milling Machine

Colt Manual and Magnetic Starters on Hand Miller

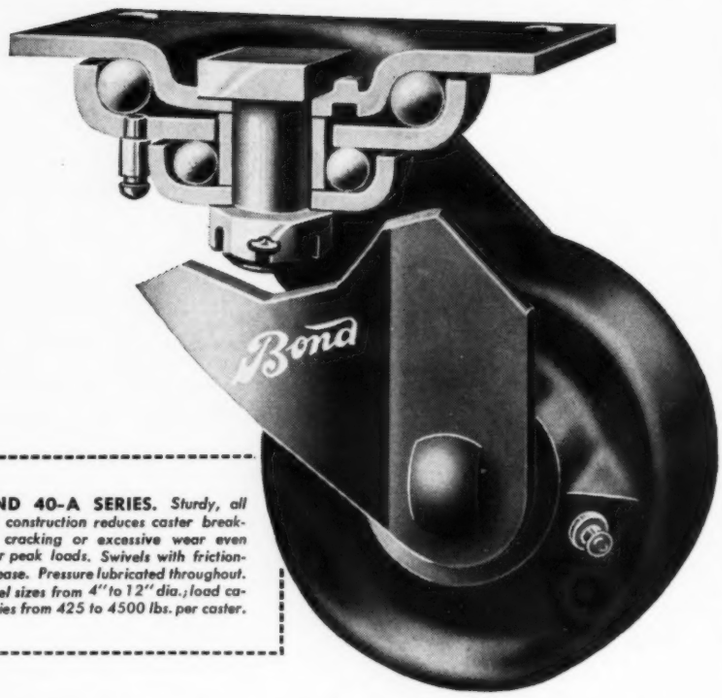
Colt Magnetic Starter and Push Button Station on Drill Press

COLT'S PATENT FIRE ARMS MFG. CO., ELECTRICAL DIVISION, HARTFORD, CONN.

The Engineer's the Pioneer!

In modern war . . . on both military front and industrial front . . . the pioneer work is done by the engineers. For example, Bond engineers pioneered basic improvements in truck casters that now serve leading war industries.

Bond Casters Fit the War Job!



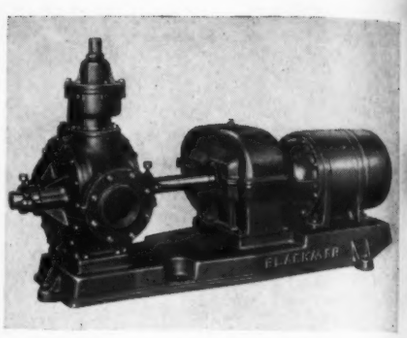
BOND 40-A SERIES. *Sturdy, all steel construction reduces caster breakage, cracking or excessive wear even under peak loads. Swivels with frictionless ease. Pressure lubricated throughout. Wheel sizes from 4" to 12" dia.; load capacities from 425 to 4500 lbs. per caster.*

BOND engineering is "down to earth"—it pioneers improvements that fit the caster to the job. That's been the Bond policy for over a quarter century and it produces industrial casters that last longer . . . swivel easier . . . and *speed up war production by speeding up handling of war materials.* Write for Bond Catalog K-34—and choose the casters that fit *your* war job.

BOND FOUNDRY & MACHINE COMPANY, MANHEIM, PA.

Bond* TRUCK CASTERS

* Reg. U. S. Pat. Off.



make fitting unnecessary. The unit is made in capacities from 20 to 750 g.p.m. and pressures up to 300 lb. per sq. in. Blackmer Pump Co., Grand Rapids, Mich.

Heavy-Duty Glove for Women

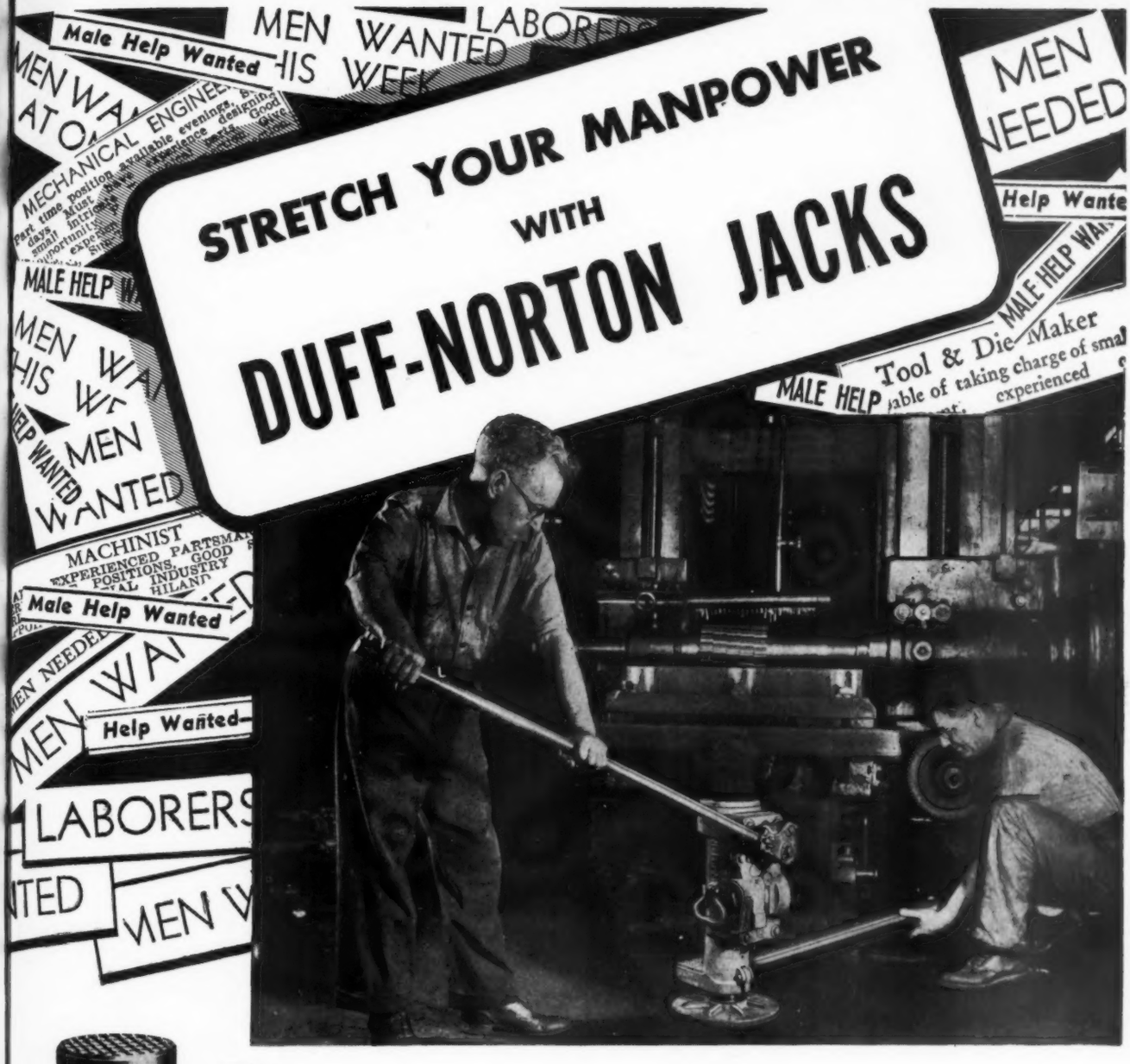
To handle rough, jagged materials, a steel reinforced gauntlet has been adapted for women's wear. Made of chrome tanned leather, it is reinforced on all wearing surfaces with steel ribbons diagonally

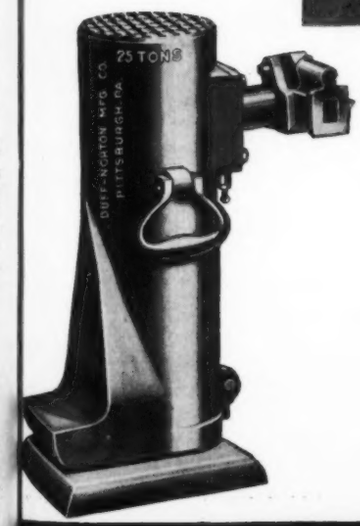
placed for protection against cuts and snags. Junction of palm and thumb has extra leather and steel ribbon for added safety. Seams are sewed with steel thread. May be had in gauntlet style or with 2-in. wristband. Industrial Gloves Co., Danville, Ill.

Impregnated and Coated Felts

Rubber-like felts offer a substitute for rubber in sealing, insulating, and padding, for gaskets, washers, buffers, and other uses. Nine types of impregnated or seal-coated materials are now available. Resilient, oil and moisture resistant, these felts are fabricated in any size and any shape. Coatings can be applied to furnished cut parts or the complete job can be done according to individual specifications. Automotive Rubber Co., 8001 Epworth Blvd., Detroit.

STRETCH YOUR MANPOWER WITH DUFF-NORTON JACKS



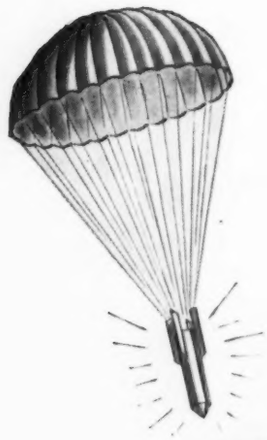


Today, every means of getting *more work* done *faster* is vitally needed! Look to Duff-Norton Jacks to speed your production, save your men valuable time.

Duff-Norton Jacks multiply your manpower . . . furnish "Mechanical Muscles" that help on every job. Check your supply of Duff-Nortons and make sure your stock is sufficient. Catalog 201 and the new 16-page Jack Maintenance Manual are yours on request . . . without obligation.

THE DUFF-NORTON MANUFACTURING COMPANY
PITTSBURGH, PA.

Canadian Plant: COATICOOK, QUE. District Representatives in Principal Cities



FOR LIGHTING THE WAY TO THE TARGET

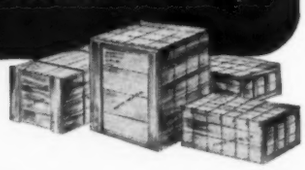
BEFORE parachute flares are ever called upon to light up a nocturnal target, they must travel thousands of miles over land and sea—withstand rough handling and other transportation hazards. Engineered containers provide adequate protection to parachute flares as well as other vital shipments . . . assure arrival in perfect condition.

General Box engineers are helping scores of manufacturers determine the shipping container best suited for their products. They have aided many war product shippers in deciding which of the allowable alternate specifications would give them the best results. Their knowledge of the availability of required materials has been of practical assistance to many others.

If you have a shipping container problem, write us. We may be able to help you assure fast, safe packing and shipping for your war products.

For manufacturers of war products: General Heavy Duty Wire-Bound and Nailed Wooden **BOXES** *and* **CRATES**
For Domestic Service: Corrugated **BOXES** *and Wood Cleated Fibreboard* **CRATES**
Discontinued for the Duration: Generalite and Nailed Strapped **BEVERAGE CASES**

GENERAL BOX COMPANY



GENERAL OFFICES: **504 North Dearborn Street, Chicago, Illinois**
DISTRICT OFFICES AND PLANTS: **Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, New Orleans, Sheboygan, Winchendon; Continental Box Company, Inc.: Houston, Dallas.**

Significant Labor Developments

(*Continued from page 65*)

miner's workday comprises "portal to portal time."

For comingling "hot" goods with others to be shipped in interstate commerce, the company was adjudged to have violated the Act. (Southern Advance Bag & Paper Company, Inc., vs. U. S.)

Enforcement

A court denied an injunction against an employer who in good faith ceased his violations when officially notified that the Act applied to his operations. (Walling vs. Buettner & Company.)

An employer was enjoined from violating the Wage-Hour Act even though he made an honest effort to comply with it as he understood it and followed suggestions of a Wage-Hour inspector. (Fleming vs. Lipshutz.)

For paying what the Court stigmatized as a medieval wage, the pittance paid homeworkers, a mill was fined $15,000 and ordered to place $50,000 in escrow to insure restitution of back pay and overtime. (General Ribbon Mills.)

The employment of oppressive child labor and falsification of records did not aid the company. Criminal prosecutions for violation of the Wage-Hour Law are increasing. The policy favored by the administrator is thus summarized by the Court when it announced that, despite the fact that officers of the corporation were not involved in the charges, imposition of jail sentences on the officers would end such flagrant violations. (U. S. vs. Chiumento.)

A court refused to place employers convicted of violating the Wage-Hour Law on probation conditioned upon restitution of back wages. (U. S. vs. Chiumento.)

WAR LABOR BOARD

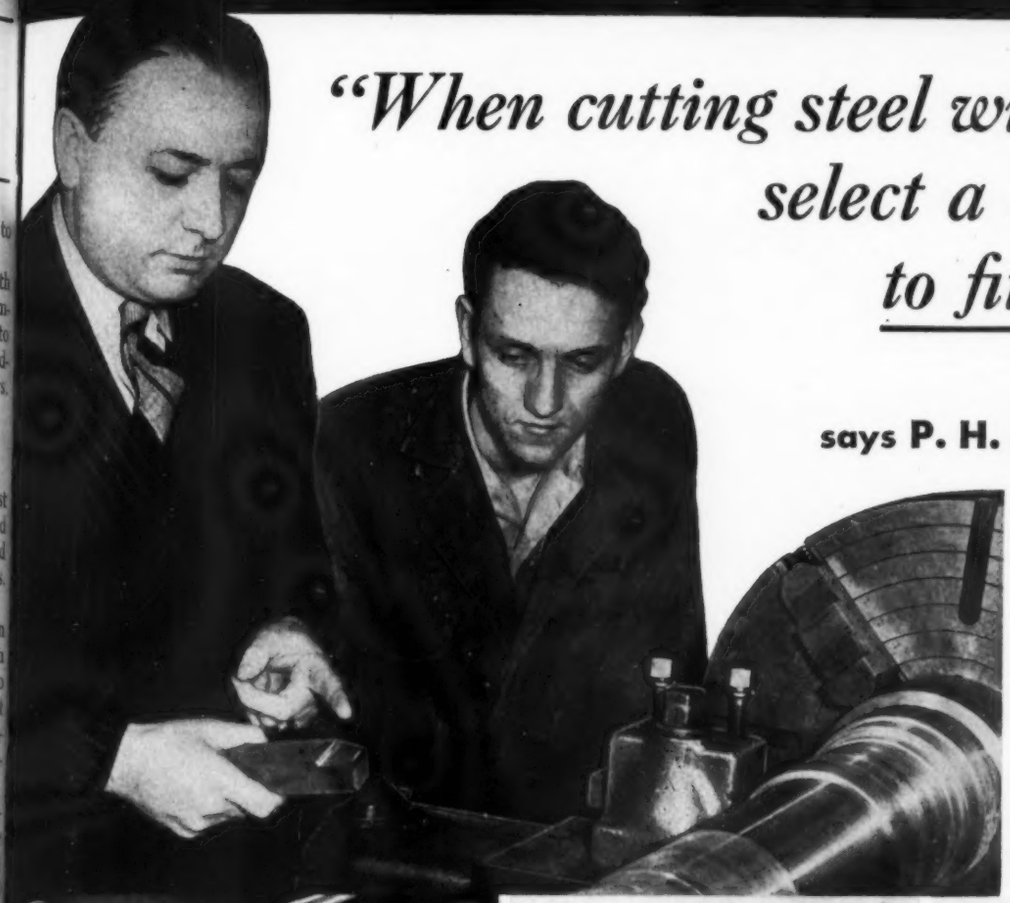
** WLB Defers to NLRB*

WLB refused to interfere with the collective bargaining process by ordering the exclusive recognition of a union representing a majority of employees. WLB, however, did order an interim settlement which called for recognition of the union for its members in handling grievances and urged the NRLB

* *In this and the following classification items marked with an asterisk also are considered to be trend indicators.*

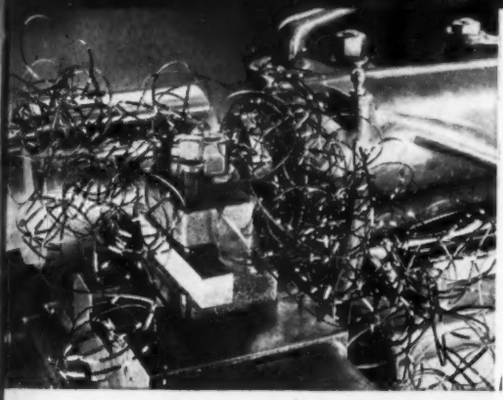
CUTTING TOOL TIPS FROM THE TOP-NOTCHERS — #2

"When cutting steel with carbides... select a chip breaker to fit the job!"

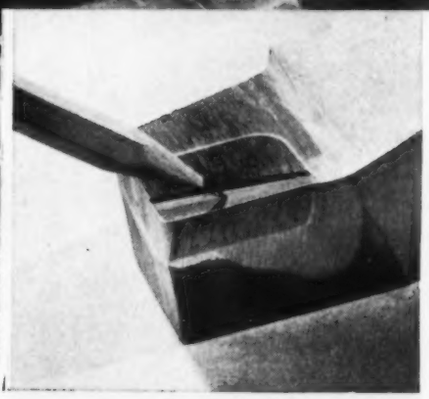


says P. H. MILLER, Chief Engineer
Carboloy Company, Inc.
Detroit, Michigan

BECAUSE OF its high tensile strength, steel normally produces a continuous chip during machining operations. These chips are awkward to handle even at the slower cutting speeds of high-speed steel tools and present a real problem in safe economical disposal at the high speeds common with cemented carbide tools. To get maximum results, chips must be controlled by the use of a suitable chip breaker.



"THERE'S NO TIME for making 'hay' on steel cutting jobs today! Chips like these are a hazard to the operator, slow down production and often mar the finish of the work. They are easy to eliminate with the right type of chip breaker."



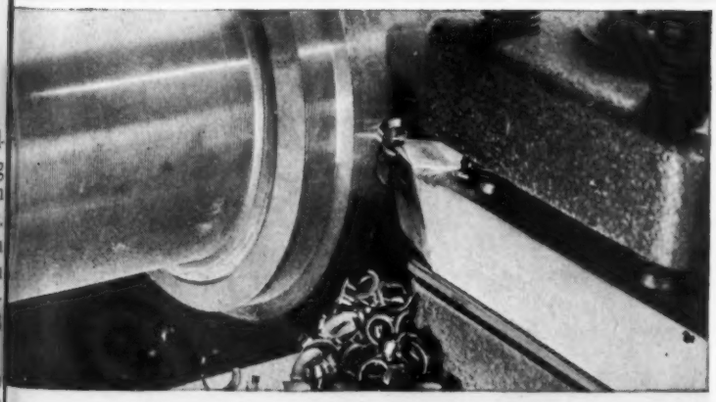
"THE GROUND-IN STEP CHIP BREAKER is the most widely used type. Recommended for practically all steel cutting jobs, this chip breaker can be adjusted to meet individual conditions, in most cases, simply by varying the width."

RECOMMENDED WIDTH OF CHIP BREAKER (W)

Depth Cut Inches	FEED In. Per Rev.	.008-.012	.013-.017	.018-.022	.023-.027	.028-.032
	1/64 - 3/64	1/16	5/64	3/32	7/64	1/8
	1/16 - 1/4	3/32	1/8	5/32	11/64	3/16
	5/16 - 1/2	1/8	5/32	3/16	13/64	7/32
	9/16 - 3/4	5/32	3/16	7/32	15/64	1/4

NOTE: A chip breaker depth of .020 is satisfactory for most types of steel.

"THIS TABLE is a general guide to proper widths for ground-in step chip breakers. They represent starting points from which adjustments can be made to produce the most satisfactory chip, as determined by the breaking characteristics of the steel being cut."



"AS THE ABOVE PHOTOGRAPH SHOWS, when the chip breaker is right, you get a chip easy to handle and easy on the tool. There are no dangerous spirals of steel 'hay' to injure the operator. When the chip breaker selected fits the job, chips peel off work uniformly and safely."

The selection of a proper cutting oil is as important as the selection of the right chip breaker. That's why Shell has developed a control technique that "balances" the oil to the machine, the application and the tool. Call in the Shell man now for details.

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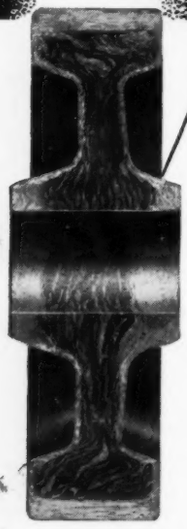

A wheel so dependable, great troop-carrying Commando Gliders depend on it to take them off the ground and land them safely again. This is a new job for A B K Wheels.

THE MOVEMENT OF MATERIALS FOR INDUSTRY will always continue to be our big job during this war and the peace to come. Have you taken stock of the rubber-tired and other floor-protective wheels in your plant which are fast wearing out? Have you given serious thought to the proper type of replacement wheels? Remember, A B K Resinoid Wheels not only protect your floors, but they roll easily under the heaviest loads, both on hand-operated and power-pulled trucks and trailers; they are unaffected by oils and greases and are absolutely spark-proof. Deliveries are good, on good priorities. Request A B K catalog No. 153-B1.

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THE RAPIDS-STANDARD COMPANY, Inc.
GRAND RAPIDS, MICHIGAN

to expedite the election. (Tennessee Schuykill Corporation.)

Jurisdiction of Management

Under the Building Stabilization Agreement management has the right to determine what craft should do certain work, and no matter how justified the grievance a union which strikes is in violation of the agreement.

The Board of Review under the Building Stabilization Agreement reaffirmed the right of an employer owning expensive equipment and having employees competent to handle it, to determine what craft should do the work.

** Fifteen Percent Formula Upheld*

WLB defended its 15 percent formula in denying an increase to 150,000 employees where the average weekly earnings of factory workers had increased about 50 percent over earnings prevailing on the base date. To avoid the threat of litigation, the Board advised management that it could achieve the same end by extending working hours. (Meat packinghouse case.)

In a 7 to 5 decision, WLB denied a general wage increase to employees of 8 California airframe companies. The majority, adhering to the 15 percent formula, saw no justification for the increase, since increases had already been granted at a prior date, and the rates compared favorably with those paid for similar work in aircraft parts and general manufacturing plants in the area. (Boeing Aircraft.)

** Recognition of Minority Union Ordered*

Because management had to a marked degree contributed to work stoppage and employee dissatisfaction by its anti-union attitude, WLB ordered it to recognize a minority union for handling grievances of its own members, to initiate a seniority plan, and establish grievance procedure with arbitration as a final step. (Winchester Repeating Arms Company.)

** Closed Shop Outlawed*

A shipyard operating under a Zone Stabilization Agreement calling for a closed shop was held to have violated the Corporation Law of Florida. This ruling, however, applies only to wartime situations. (Florida vs. Tampa Shipbuilding Company.)

Union Shop Conditions Frozen

WLB served notice that union shop conditions are frozen for the duration. The Board warned that no company may take advantage of labor's nonstrike pledge which had been agreed

A Practical Solution for many Finishing Problems

In *your* plant—right now—there are dozens of sanding, polishing and finishing operations for which this Delta Abrasive Finishing Machine is ideal. Here's why: It is husky enough to stand the grind of the production line. Its advanced design permits quick, accurate adjustments for a large variety of jobs. It is light enough to be easily moved around to just where you need it, and the price is surprisingly low. Find out for yourself why thousands of shops have found it so efficient for finning, finishing and surfacing metal and plastic parts.

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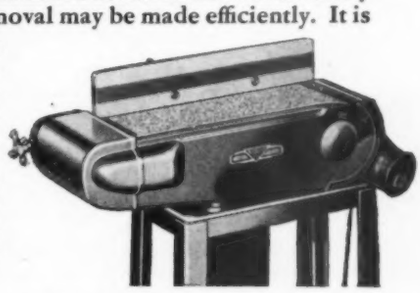

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. . . equipped with

GENERAL JUMBO JRS.

will protect your floors . . .

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YOU *may* have these latest Orangeville industrial truck models operating in your plant today. If so, you bought them before Pearl Harbor . . . before critical material shortages put them on the shelf for duration.

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upon by labor and management, to provisions affording less security to the union.

To meet the company's claim that it had agreed to a union shop only as an experiment and that, subsequent to the expiration of the contract, many employees had accepted work without notice that they would be subject to union shop conditions, the Board ordered the company to continue the union shop with this proviso: for employees hired between the contract's expiration date and the date of the Board's order, membership maintenance with a 15-day escape clause shall apply. (Harvill Aircraft Die Casting Corporation.)

* *WLB Penalizes Strikers*

WLB manifested its refusal to tolerate any practices which condone strikes by making no allowance for work stoppage even though caused by employees respecting a picket line. The Board also rejected a union maintenance of membership clause where the contract made no provision for it. (Ohio Bell Telephone Company.)

WLB ordered an employer to reinstate strikers who struck in protest against alleged anti-union acts of the employer. No back pay however, was required, the Board recognizing that the matter was one for the NLRB. (Montag Brothers, Inc.)

Unit Application for Wage Increase

A single application may now be made for wage adjustment in several plants, provided the application is filed with the Regional Director of the Wage-Hour Division in the region where the employer maintains his principal place of business.

Arbitration Limited

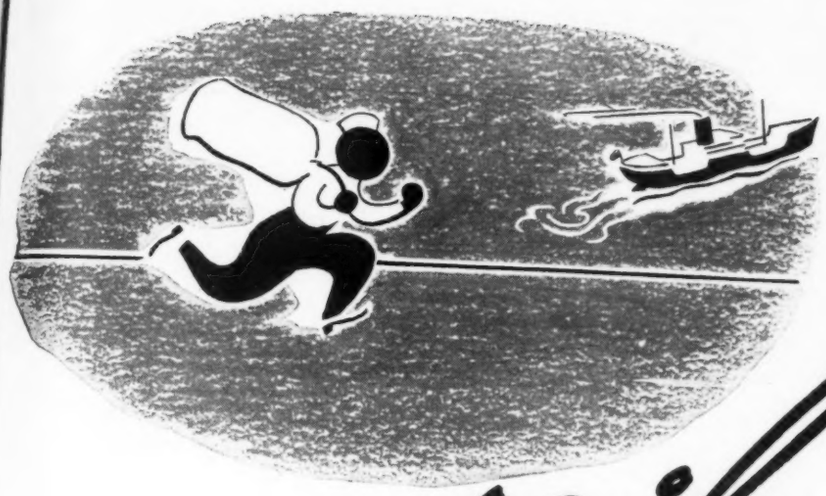
WLB refuses to review any award except those that involve wage disputes, even though the parties have mutually agreed to seek the Board review. The reason advanced is that the practice would tend to destroy the institution of voluntary arbitration. (Sullivan Drydock & Repair Company.)

Wage Increases and Lost Premium Pay

Presidential Order 9240 banning double time on Sunday is beginning to have its effects in indirect forms of pay increase. WLB now allows a shift bonus to make up for lost pay because of the elimination of double time on Sunday.

The Board's reasons are that premium pay for Sunday work constituted an essential part of the employee's wages, and that it was not the purpose of the Executive Order to reduce the total earnings of employees.

In making such allowance, however,



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DELAY THREATENED IN DEPARTURE OF WAR MATERIEL BY BROKEN BLADES IN STEAMSHIP TURBINE. PROPER BLADES RELEASED ON PRIORITY, FLOWN TO PACIFIC COAST PORT. AT WESTINGHOUSE DISTRICT MANUFACTURING AND REPAIR PLANT, SPINDLE WAS CLEANED, REBLADED AT MIDNIGHT, BALANCED BY 4:00 A.M., DELIVERED TO SHIP AND INSTALLED FOR SHIP TO LEAVE ON SCHEDULE AT 8:00 A.M.

Westinghouse

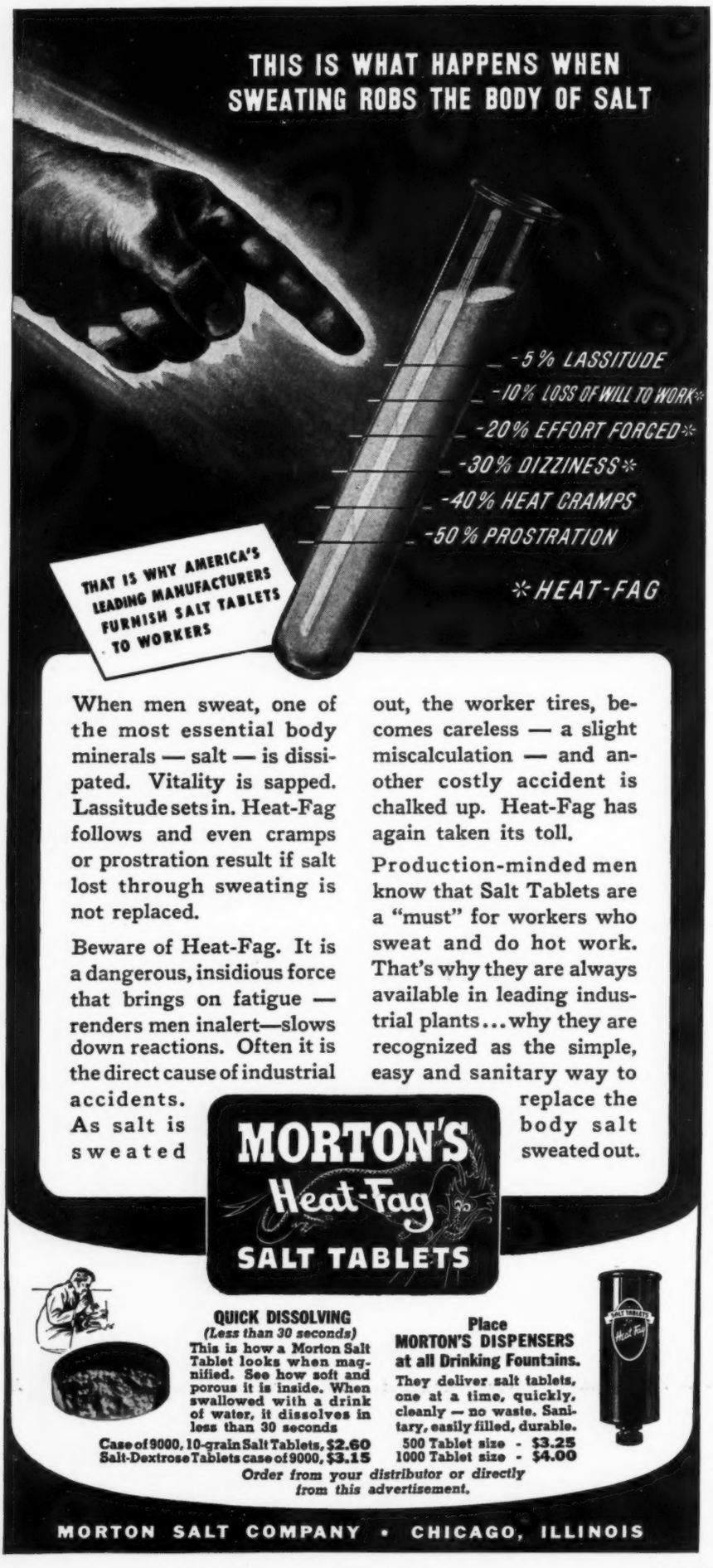
DISTRICT MANUFACTURING AND REPAIR

J-90466

IF **THE EQUIPMENT NEEDING REPAIR IS VITAL TO THE WAR EFFORT . . . PHONE THE NEAREST OFFICE OF WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY FOR**

EMERGENCY SERVICE

33 M & R PLANTS . . . ONE NEAR YOU!


THIS IS WHAT HAPPENS WHEN
SWEATING ROBS THE BODY OF SALT
-5% LASSITUDE
-10% LOSS OF WILL TO WORK*
-20% EFFORT FORCED*
-30% DIZZINESS*
-40% HEAT CRAMPS
-50% PROSTRATION
*HEAT-FAG
THAT IS WHY AMERICA'S LEADING MANUFACTURERS FURNISH SALT TABLETS TO WORKERS
When men sweat, one of the most essential body minerals — salt — is dissipated. Vitality is sapped. Lassitude sets in. Heat-Fag follows and even cramps or prostration result if salt lost through sweating is not replaced.
Beware of Heat-Fag. It is a dangerous, insidious force that brings on fatigue — renders men inalert—slows down reactions. Often it is the direct cause of industrial accidents. As salt is sweated out, the worker tires, becomes careless — a slight miscalculation — and another costly accident is chalked up. Heat-Fag has again taken its toll.
Production-minded men know that Salt Tablets are a "must" for workers who sweat and do hot work. That's why they are always available in leading industrial plants...why they are recognized as the simple, easy and sanitary way to replace the body salt sweated out.
MORTON'S
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SALT TABLETS
QUICK DISSOLVING
(Less than 30 seconds)
This is how a Morton Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds
Case of 9000, 10-grain Salt Tablets, $2.60
Salt-Dextrose Tablets case of 9000, $3.15
Place
MORTON'S DISPENSERS
at all Drinking Fountains.
They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.
500 Tablet size - $3.25
1000 Tablet size - $4.00
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the Board takes the necessary precautions against impairment of the production program. It sustained the right of a company to establish a swing shift schedule where this was necessary to procure maximum production. Under such a plan, some employees would be required to work on Sunday but would not be entitled to double time since they did not work a seventh consecutive day within a given work week. (York Safe & Lock Company, New Britain Machine Company.)

NATIONAL LABOR RELATIONS BOARD

** No Injunction Against NLRB*

The Federal District Court ruled that it did not have authority to enjoin NLRB from giving relief against an unfair labor practice. Each member of the Board is presumed to be impartial and if any review is sought it must be had by appeal to the Circuit Court of Appeals. (Oregon Shipbuilding Corporation vs. NLRB.)

A court upheld a Labor Board order that an employer refrain from giving effect to its closed shop contract with an AFL union since the contract was hastily executed when the employer knew of CIO's claim that it represented the employees.

Furthermore a contract is only entitled to the protection of the Wagner Act if it is made with a union having an uncoerced majority at the time the contract was executed.

The order, ruled the court, did not impair the employees' right to strike and hence could not be set aside. (NLRB vs. John Engelhorn & Sons.)

Reinstatement and Back Pay

Where NLRB found management supporting an inside union and acting discriminatorily to discourage membership in an outside union, even though the resulting strike was an economic one, the Board ordered reinstatement of large numbers of strikers with back pay extending over six years as a penalty. (Berkshire Knitting Mills.)

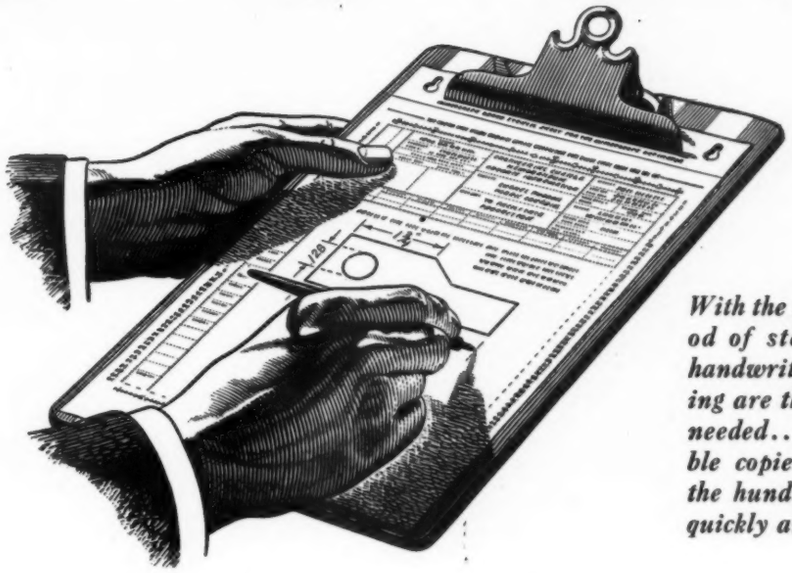
An employer ordered by the NLRB to pay back wages to employees whom he had unlawfully discharged may not deduct from the amount due, the unemployment compensation received by the employees from the state. (Marshall Field & Company vs. NLRB.)

** Refusal to Bargain*

NLRB held an employer guilty of refusing to bargain collectively when it questioned the union's status as the appropriate bargaining unit. The employer's claim that employees of a sub-

The new easier method of producing

Engineering Change Notices



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The permanent form for the engineering change notice is die-impressed on Mimeograph brand stencil sheets. All the engineer has to do to change instructions or design is to handwrite and hand sketch with the stylus on the die-impressed Mimeograph stencil. The necessary number of copies is then produced on the Mimeograph duplicator *and within fifteen minutes the change is in effect!* Valuable man-hours are saved, production is speeded, costs are substantially reduced, chance of error is eliminated!

If you want to save man-hours by simplifying the method of handling your engineering change notices, write A. B. Dick Company, Chicago, for samples and detailed information.

Engineers in leading aircraft industries and other manufacturing concerns all over the country have welcomed this advanced method of handling vital engineering change notices because of these outstanding advantages:

1. ***The ease of making the original copy***—as simple as writing with pencil
2. ***The speed*** with which this one handwriting can be given large distribution—in a matter of minutes a hundred or a thousand copies can be produced
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4. ***The clear and permanent legibility*** of these black and white copies.

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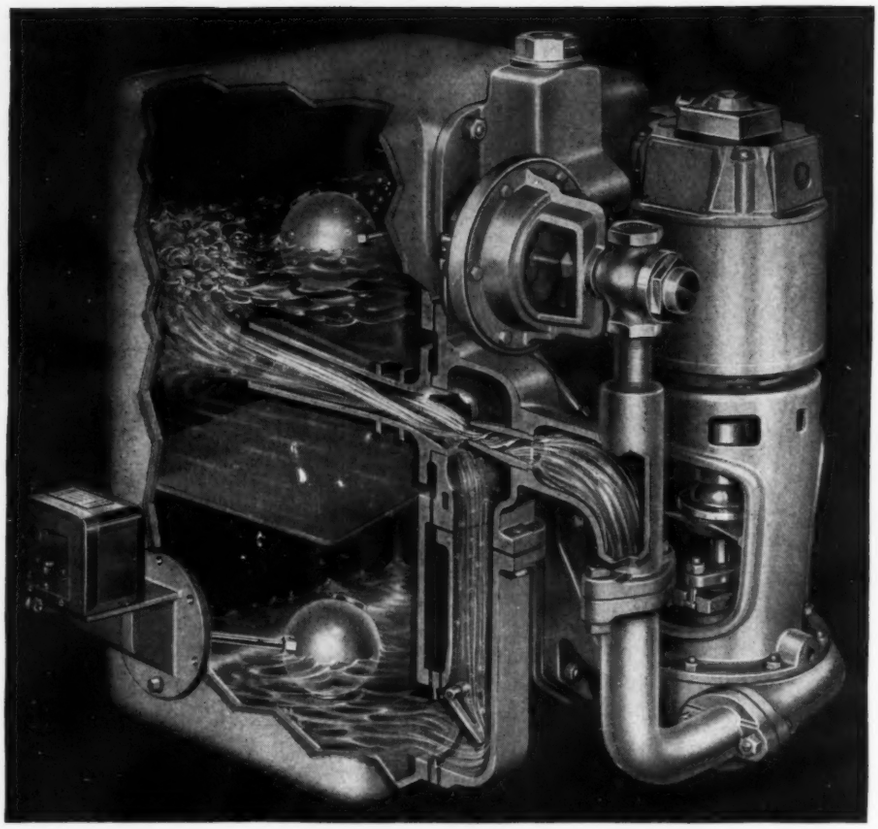
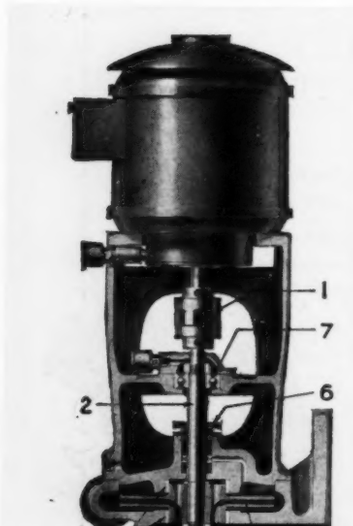


KEEPS STEAM LINES CLEARED FOR ACTION—**BETTER STEAM PLANT OPERATION BEGINS WITH EFFICIENT CONDENSATE RETURN**



You can always bank on the Hoffman-Economy "V-V" Vacuum Pump to do a job! A marvel of compact efficiency—featuring the Jet Vacuum Producer, simplest and most effective method of removing air from steam lines.

We set the motor high above the floor to protect it from dirt and water. We bored the motor support simultaneously with the bearing seats for perfect alignment. We connected pump and motor with a *flexible coupling*...so that a standard motor could be used.

The numbered points in the cut-away tell the story of mechanical excellence: (1) Heavy duty flexible coupling (2) stainless steel shaft (3) renewable bronze wearing rings (4) oil-less renewable bearing (5) enclosed bronze impeller (6) split bronze packing gland (7) shielded deep-groove ball bearing carries pump shaft independent of motor bearings. These are a few of the reasons this pump satisfies the critical engineer.

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sidiary company should be included in the unit was deemed to have been untimely and to have evidenced bad faith. (Sadourian Export Corporation.)

Domination

Support given an inside union under the guise of promoting harmony was held to constitute domination in violation of the Wagner Act. (Wapakoneta Machine Company.)

Management was charged with domination when it allowed negotiations to continue with an inside union after three members of the bargaining committee resigned when it failed to secure a contract.

The Circuit Court of Appeals refused to sustain a Labor Board order directing the disestablishment of a dominated union, even though it agreed with its findings. In that case the union requested the employer to recognize, not it, but its board of directors as the bargaining agent, which board was found to represent management. (NLRB vs. Germain Seed & Plant Company.)

* *Labor's Immunity from Anti-Trust Re-Affirmed*

In upholding Petrillo's ban on recordings, the U. S. Supreme Court put beyond all doubt labor's immunity from anti-trust laws where a labor dispute is involved. Under this decision, Petrillo enjoys dictatorial power over musicians and may prevent them from making recordings and compel them to become union members without any responsibility under the anti-trust law for the resulting restraint of trade. (U. S. vs. Petrillo.)

* *Penalty for Union Misconduct*

NLRB set aside an election because the union distributed sample ballots bearing the name of the Board's regional director, conveying thereby the impression that he officially favored the union. (Sears, Roebuck & Company.)

* *Liability of Company*

The Board held a corporation liable for the anti-union acts of one of the large stockholders who, the employees believed, was a company official. (Texas, New Mexico & Oklahoma Coaches, Inc.)

The company's conduct as a whole and not various phases of it will be considered by NLRB in ascertaining liability under the Wagner Act. Anti-union speeches and letters by high company officers will not, therefore, be viewed as something apart from coercive statements of supervisory person-

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A FEW OF THE HUNDREDS OF SIMILAR CASES IN GULF'S FILES

Gun Barrels . . . Consulted by a large ordnance plant on the possibility of obtaining greater production in the reaming of cartridge chambers in 1.1 gun barrels, a Gulf Lubrication Service Engineer recommended Gulf Electro Cutting Oil A. Result: production of reamed barrels increased 1500%—rejections reduced 50%.

★

37 Mm. Shot . . . A manufacture of 37 mm. shot increased production 30%, reduced tool regrinds and down time for machine maintenance 50%, reduced cutting oil consumption 50%, and obtained better finishes on the work through the use of Gulf L. S. Cutting Base B blended with Gulf Cut-Aid.

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Torpedo Gears . . . By using the cutting oil recommended by a Gulf Lubrication Service Engineer, a manufacturer of torpedo parts increased output 41%, improved finish, and reduced rejects in cutting Monel metal gear blanks.

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Tank Tread Pins . . . A manufacturer of tank tread pins increased production per tool dressing from 85 pieces to 600 pieces by using Gulf Lasupar Cutting Oil C.

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Artillery Recoil Cylinders . . . By using Gulf L. S. Cutting Base A, a large ordnance plant increased production 30% and increased tool life 300% in machining operations on hardened nickel chrome steel forgings for artillery recoil cylinders.

Bomb Striker Nuts . . . Consulted by a manufacturer of steel striker nuts for bombs on the problem of 100% rejection of production due to torn threads in a tapping operation, a Gulf Lubrication Service Engineer recommended Gulf Lasupar Cutting Oil A and a suitable level on the end of the tap. Result: rejections entirely eliminated, production greatly increased.

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As a result of proven performance, over a thousand plants with difficult machining operations have adopted Gulf Cutting Oils during the past six months. Here's the record of improved machining practice in these plants: Production increased as much as 300%, tool life increased as much as 2000%, and marked improvements in finish. Write or 'phone your nearest Gulf office today for effective help on *your* machining problems.

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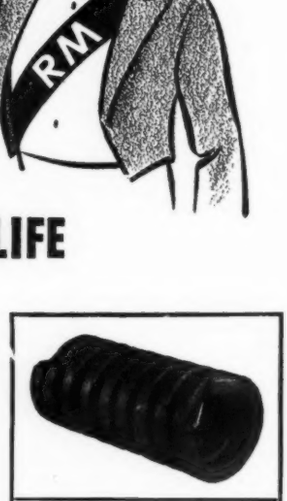
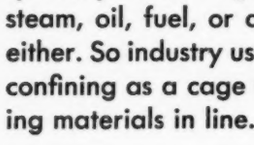
It wouldn't do for Gargantua the Great to be on the loose, so he's confined to a specially built cage. It wouldn't do for steam, oil, fuel, or air to "get out of line," either. So industry uses R/M packings . . . as confining as a cage when it comes to holding materials in line.

Today's higher pressures put an added strain on packing, but R/M packings are equal to the task. R/M engineers are at it early and late, improving the sealing quality of R/M products. Army-Navy "E" awards aren't given lightly. They're a mark of merit in production for war.

Do you have a copy of the R/M catalog? It's keyed for applications, illustrated, and indexed as to materials and types. Get a copy from your R/M distributor, or write us direct.





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nel. (Sunbeam Electric Manufacturing Company.)

Avoid Suspicion of Coercion

The slightest suspicion of any coercion or interference by anyone connected with management has been attributed by the Labor Board to management and regarded as a clear violation of the Wagner Act. Thus the conduct of a chief foreman's wife in opposing the activities of the union was blamed on the employer, since, the Board claimed, the employees believed that she reflected the employer's attitude. (Taylor-Colquitt Company.)

In ascertaining liability under the Wagner Act the test is not the good intention of the employer or his freedom from guilt, but the belief of employees.

An employer may violate the Wagner Act by means other than actual blocking of negotiations. Any form of conduct by management which may be interpreted as a refusal to bargain may expose management to the charge of violating the Wagner Act. Stalling in negotiations may indicate an intent not to comply with the Act.

The employer must attempt in good faith to reach an agreement; this as well as the duty to recognize the duly elected bargaining agent, participate in negotiations, and enter a binding agreement on terms mutually acceptable, constitutes management's responsibility under the Wagner Act.

Neither the Labor Board nor the courts will tolerate any evasion of the duty to bargain collectively, and the burden of establishing good faith rests upon management where the circumstances cast any doubt upon management's motive.

An individual contract must give way to a collective agreement even though the individual contract was entered into in good faith and is still in existence. (NLRB vs. J. I. Case Company.)

How New Britain Recruited Women

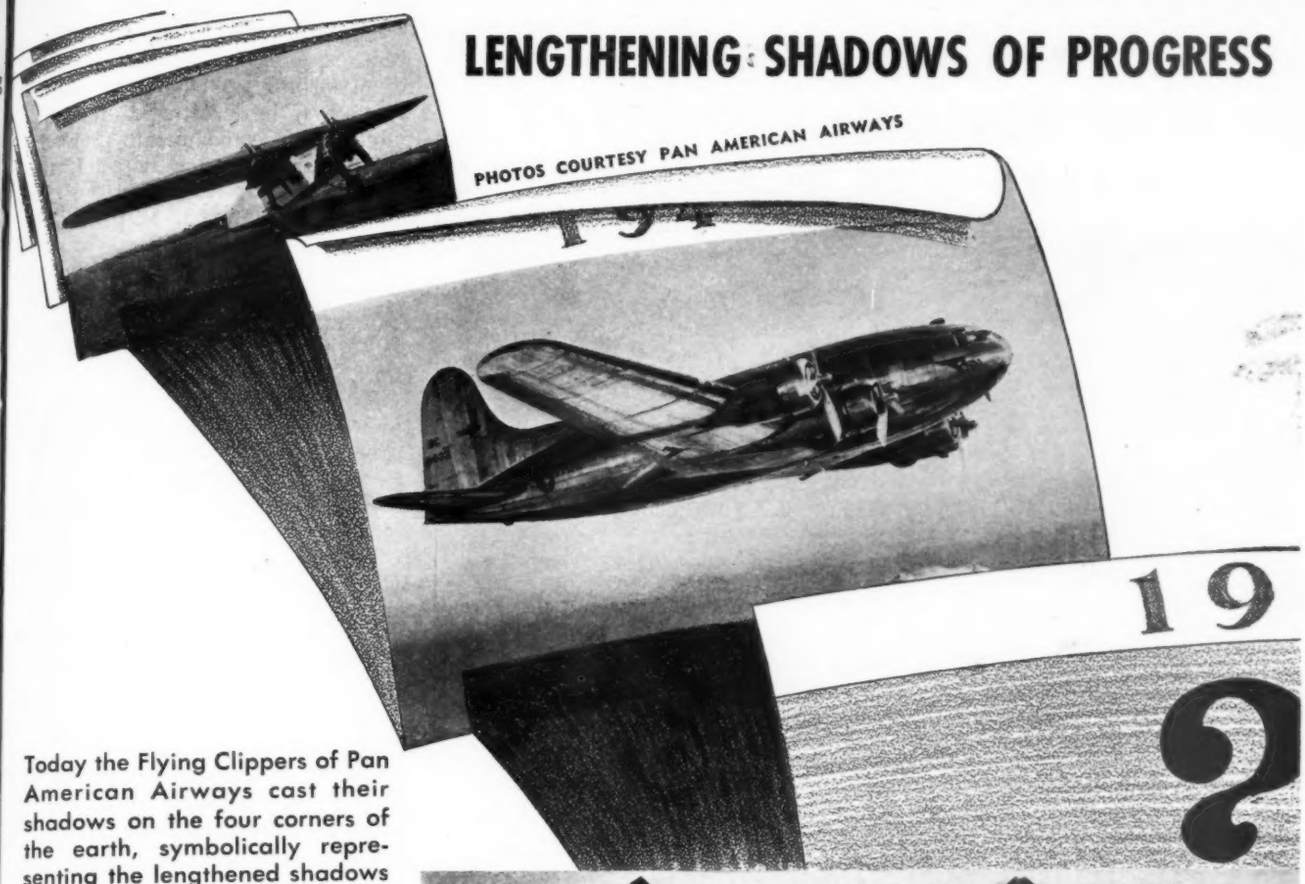
(*Continued from page 68*)

had solved the problems that women faced when they undertook war work. Billboards strategically located for city wide coverage were also used to emphasize the need for women in industry. Radio was purposely avoided, because it was felt that such an approach overlapping other areas might be construed as "pirating."

Movie trailers telling a graphic story of the need for women in war plants

LENGTHENING SHADOWS OF PROGRESS

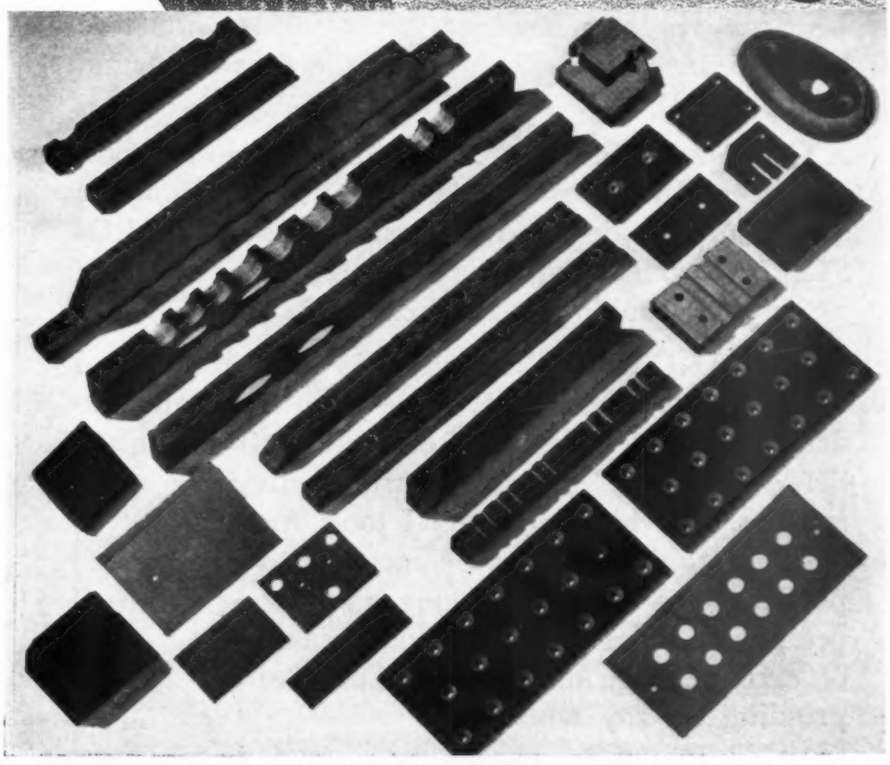
PHOTOS COURTESY PAN AMERICAN AIRWAYS



Today the Flying Clippers of Pan American Airways cast their shadows on the four corners of the earth, symbolically representing the lengthened shadows cast by the modest FOKKER F7, first used by Pan American in 1927 over the single route between Key West and Havana . . . They are the ever-lengthening shadows of progress.

With constant improvement, research and close collaboration with aviation design engineers, C-D Plastics are likewise casting an ever-lengthening shadow of sure progress in the field of aviation. Without question C-D Plastics have played an important role among the many material advancements that have made possible today's flying giants. This progress has resulted in better plastics with greater mechanical, electrical and structural properties.

Illustrated are just a few of literally hundreds of parts now fabricated from DILECTO laminated phenolic plastics for use in modern airplanes. The knowledge and experience gained in designing these parts for aircraft applications are available to you . . . Use them to solve your "what material?" problem.



C-D products include THE PLASTICS . . . DILECTO—a laminated phenolic: CELORON—a molded phenolic: DILECTENE—a pure resin plastic especially suited to U-H-F insulation . . . THE NON-METALLICS, DIAMOND Vulcanized Fibre: VULCOID—resin impregnated vulcanized fibre: and MICABOND—built-up mica insulation. Folder GF describes all these products and gives standard sizes and specifications.

DISTRICT OFFICES: New York - Cleveland - Chicago - Spartanburg, S. C.
West Coast Rep., Marwood, Ltd., San Francisco - Sales Offices in principal cities

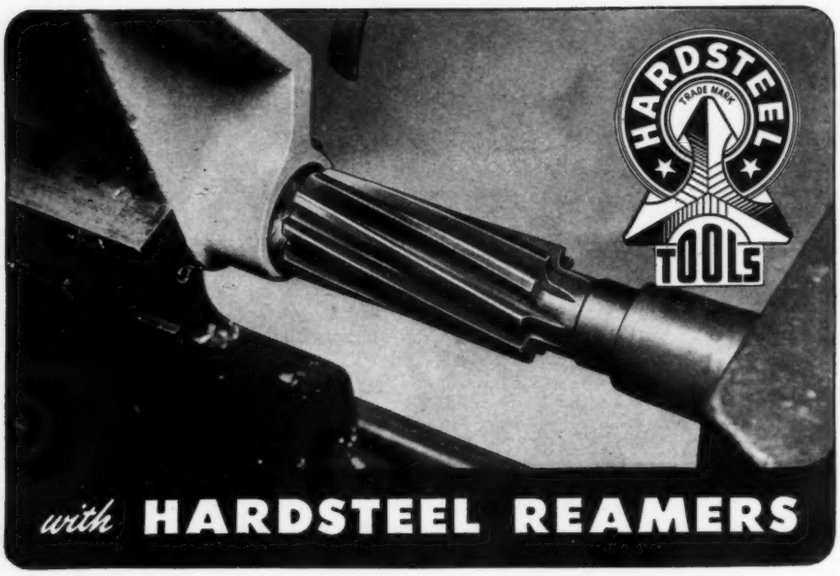
Continental-Diamond FIBRE COMPANY

Established 1895 . . Manufacturers of Laminated Plastics since 1911 — NEWARK • DELAWARE

YOU CAN REAM

HARD · TOUGH · ABRASIVE

ALLOYS AND PLASTICS



with HARDSTEEL REAMERS

Bomb rack hinges are made of an aluminum alloy —heat-treated for hardness yet tough to machine and tougher on tools because of the abrasive action of the metal.

A Cleveland manufacturer solved the almost impossible job of putting a blind hole 1 5/16 in. diameter and about 5 in. deep in these castings, using "HARDSTEEL" Reamers and taking off .015 in. of metal on a side while holding tolerance to .002 in.

One "HARDSTEEL" reamer has done more than 1200 to date and is still in service. Developed to drill hardened steels of Rockwell C 40 or higher, "HARDSTEEL" is now available in reamers, tool bits and special tools for working the abrasive alloy metals and plastics. Try it. Note its longer service per grind—faster cutting action because of extreme edge hardness—its ease of grinding on any wheel.

Write for "HARDSTEEL" operator's manual. It's free.

BLACK DRILL CO. • 5005 Euclid Ave., Cleveland, O.

YOU HARDEN IT—WE'LL DRILL IT

"HARDSTEEL"

DRILLS · REAMERS · TOOL BITS · SPECIAL TOOLS

were exhibited in leading theaters. Simultaneously, "talking windows" were set up in department stores and public utility companies to dramatize the "WIPS" (women in production service). Actual installations of machines and equipment were made by participating plants, and war workers did their every-day jobs before the eyes of the public. Loudspeaker installations enabled them to describe their work and its importance to the war effort.

To insure complete conditioning of the "market," a special folder called "How You Can Help Win the War" was distributed by Boy and Girl Scouts to 22,000 New Britain homes. This folder projected the need and the patriotic appeal, besides indicating the types of jobs available, where to go, and whom to see. In addition, it provided special information relative to child care and other pertinent facts of interest to women.

This promotion covered a period of 10 weeks, from November 20 to February 6, but actual recruiting was started on January 15, after seven full weeks of market conditioning, to assure easy entry into the homes of prospective housewife workers. Thus a carefully "pre-sold" market awaited recruiters when they started their activity.

No Loophole for Failure

Procedure for the recruiting phase of the campaign was set up during the latter part of December. As recruiting campaigns in other cities had been unsuccessful, methods were carefully analyzed to insure success for this phase of the campaign. Analysis indicated that in other campaigns volunteer recruiters had been selected, and that relatively untrained workers had met with little success.

Again it was noticed that hit-or-miss, house-to-house canvassing methods were employed in these other campaigns, without carefully laying the groundwork for the recruiter's call.

Noticeably lacking in previous efforts in other cities was any form of indirect pressure, which the committee agreed must be used to stimulate women to act in any voluntary enlistment campaign.

Taking a page out of the specialty appliance sales book, the committee decided on a carefully planned house-to-house campaign using trained saleswomen purposely selected for their ability to meet the problems which would confront them in the field.

The following recruiting procedure was then worked out:

1. Two or three women workers were selected from each of the co-

McCASKEY TOOL CRIB CONTROL

a practical system for inexperienced crib attendants

MORE PRODUCTION* WITH LESS TOOLS**

Time for tool crib transaction reduced almost 75%. *The works accountant in a modern plant reports as follows: "Previous to the McCaskey installation a time study disclosed that a tool crib transaction was completed in 1.24 minutes. Similar time studies reveal that a transaction is completed in 20 seconds in the McCaskey equipped crib." Minutes saved at the crib mean hours gained in production.*

A $2000 Windfall

The general superintendent of a large manufacturing plant writes, "One of the first results of the plan (McCaskey Tool Crib Control) was the turning in of $2000 worth of tools, virtually a windfall, so far as practical use was concerned."

★ NO DELAYS AT THE TOOL CRIB WINDOW

Faster service at the crib window is assured by McCaskey Control. Tools are located instantly whether in the crib or *on the production floor.* Responsibility for tools drawn is quickly and definitely fixed, eliminating time-killing and irritating disputes about tools returned. Numerous other savings of time frequently lost at the crib add up to *more productive hours* for men and machines—to the increased production so essential today.

McCaskey procedure is exceedingly simple. Speedy service is not dependent on memory and it enables even inexperienced attendants to do an effective job—most important now, when experience is at such a great premium. McCaskey Control is proving particularly practical also in handling today's multi-shift operations in hundreds of installations.

★ ★ NO "HOARDING" OF TOOLS NOT IN USE

With McCaskey, tools are kept in circulation preventing their accumulation in employees' tool boxes or around machines. Loss and theft of tools are likewise minimized as well as breakage. Hidden records encourage "hoarding" of tools that should be available for the use of others; the complete visibility of McCaskey prevents it almost automatically. McCaskey dated records tell at a glance how long tools have been out, indicating the ones that should be returned.

This constant check on tool availability, on where and how long they are in use, and other desirable features are enabling hundreds of plants to maintain high production with fewer tools. The danger of production delays from tool shortage is vastly minimized.

A McCaskey representative is available to render valuable assistance in helping you attain more production with less tools. Write for this assistance, *NOW*. No Service fee. No obligations.

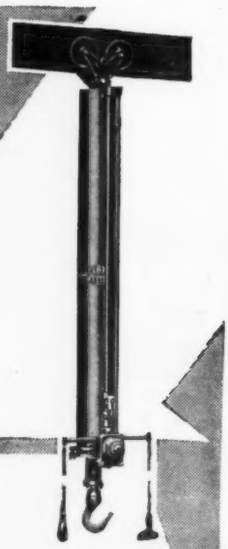
McCaskey Systems Ltd., Galt, Ontario, Canada ***The McCaskey Register Co., Watford, England***

THE McCASKEY REGISTER COMPANY, ALLIANCE, OHIO

McCASKEY INDUSTRIAL CONTROLS

PRODUCTION • INVENTORY • MAINTENANCE • TOOLS • COSTS • PAYROLL

Longer Service from Your CURTIS AIR HOISTS and CYLINDERS



★Curtis Air Hoists and Curtis Air Cylinders are speeding production of war work, releasing skilled labor for other jobs, and reducing costs in plants all over America. Curtis Air Hoists can be operated by unskilled labor, are easily handled by women, and, because they cannot be overloaded, are practically immune to abuse.

But despite their simplicity of construction and operation, proper maintenance will help to insure and extend their unusually long life — for in many cases they may have to last for the duration.

Follow these maintenance tips, and you'll get the longest possible service from your Curtis air-powered equipment:

✔ **1.** When running a new air supply line, or relocating an old one, be sure to blow out all grit, rust, and chips before connecting to the hoist.

✔ **2.** Do not install hoists close to an open furnace or other source of heat without shielding, otherwise piston leather may char or lubricant dry out.

✔ **3.** For smooth operation and long life, put one-half pint of heavy cylinder oil into the cylinder through the oil plug in rear head every 30 days. This keeps piston leather soft and prevents air leakage.

✔ **4.** If piston jumps or jerks, it indicates improper oiling or binding of rod stuffing box. Keep stuffing box leak-tight only.

✔ **5.** Fill oil cup on valve every 30 days. This admits two drops of oil every time hoist valve is operated.

✔ **6.** Drain off any condensation in cylinder periodically through drain plug in lower head.

✔ **7.** Check valve disc and seat occasionally to prevent wear from grit or dirt in air line. A worn valve causes "creeping" and loss of efficiency.

✔ **8.** By keeping hoists and cylinders clean, properly lubricated, and by replacing broken or worn-out parts now, you can increase the efficiency and long life of your equipment and prevent production shut-downs in the future.

Conserve Metals—Buy War Bonds

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1995 Kienlen Avenue • St. Louis, Missouri

operating war plants to form the recruiting staff, and paid average weekly earnings while in the field.

Callers Carefully Chosen

Selection was based on personality, aggressiveness, patriotism, number of children each worker had, husband of draft age, machine ability, languages spoken, and length of employment. The result of careful selection was a well-trained canvasser who, when faced with the inevitable question, "What are you doing in war work?" had the perfect answer, and at the same time was equipped with the knowledge necessary to tell the "prospect" all about plant working conditions and how easy it is to get a war job with good pay. Others could tell other mothers what they did with their children. Women already in industry could bring indirect pressure to bear and did.

2. Recruiters were thoroughly trained to sell the idea. A two-day training class was conducted which included: The canvass, its procedure, methods of gathering information; what to do with the children; draft dependency and its relation to women who apply for war jobs in war industry; a discussion of factory working conditions aimed at meeting the objections to working in a factory; house-to-house canvassing methods, including approach, developing need, eliminating objections; how to sell the husband on war work; demonstration by recruiters.

3. Systematic canvass procedure was evolved to eliminate duplications of effort.

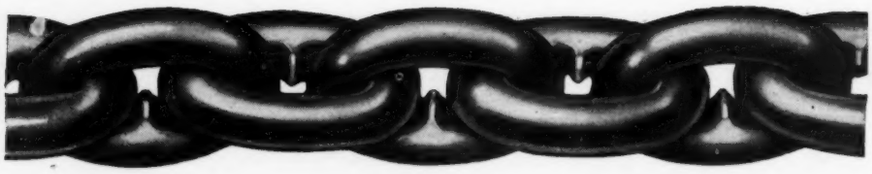
A list of 22,000 New Britain women was developed from the old-age tax lists. It included all women between the ages of 21 and 60. This list was filtered through the Manufacturers' Association list to eliminate all employed women. The list was classified by block, street address, and names of those living in the house; after filtering, it comprised 15,000 names.

Letters From USES

A letter was sent from the USES to each woman on the list. Letters went out at a rate of 500 or so daily until the list was covered. Mailing started on January 13. Appointments were scheduled for two days in advance. When a person failed to appear at the USES office for an interview, that person's name was automatically shifted to a list for follow-up by a recruiting interviewer.

At a rate of 15 to 20 interviews per interviewer it required approximately 4 to 6 weeks to canvass the

WHY IS A
TANK TRACK
TREADED?
"MORE GRIP-LESS SLIP"
—Houghton leather belts are treaded for the same reason
The patented tread impressed on the pulley side of VIM belts provides better pulley grip, uniform thickness, higher unit contact pressure. VIM TRED Leather, with its higher coefficient of friction, its greater strength, is your logical choice for power transmission. For the helpful booklet, "How to Make Your Leather Belts Last Longer" write E. F. Houghton & Co., Philadelphia.
Houghton's
VIM TRED LEATHER BELT



STRONG LINKS

in the world's greatest production schedules

Almost overnight, American industrial manufacturers have achieved stupendous production records that make the Axis shudder. Strong links in reaching the world's greatest production schedules are men, machines and equipment.

Herc-Alloy Steel Chain with the patented "Inswell" electric weld is helping America maintain these fast schedules by providing safety and efficiency in the transportation and handling of materials. Fabricated from a special analysis heat treated alloy steel, the short, stubby links bridge square corners without gouging or kinking. Write for the facts on Herc-Alloy Chain, today. Descriptive catalog No. 44 will be sent on request.

CM HERC-ALLOY

STEEL CHAIN

★ ★ ★

INVEST REGULARLY IN VICTORY—BUY WAR BONDS AND STAMPS

★ ★ ★

COLUMBUS-McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corporation)

120 FREMONT AVENUE, TONAWANDA, NEW YORK

BRANCH OFFICES: NEW YORK • CHICAGO • CLEVELAND

list of those who failed to come in for an interview.

Interviewers were assigned names and street addresses, by blocks. Each solicitor sought (1) to obtain information relative to the prospective housewife workers that would help to furnish a manpower picture of New Britain women; (2) to attempt to get every woman to report to the USES for an interview relative to going to work in war industry.

Adequately Trained

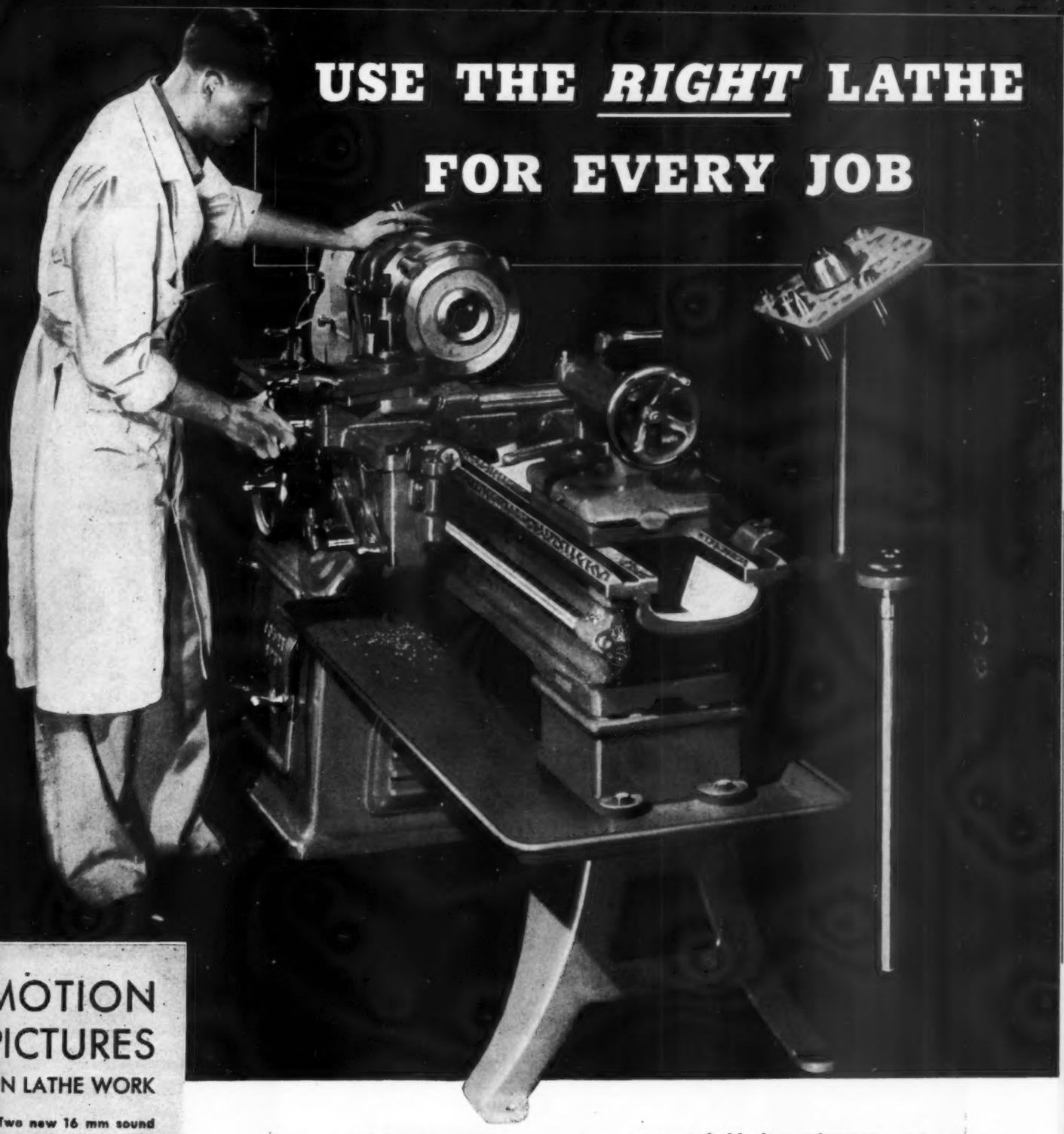
Each interviewer was trained to give the prospective worker a full picture of (1) the need for New Britain women in industry; (2) types of jobs available; (3) working conditions within the plants; (4) advantages of an additional pay check; (5) what to do with their children; (6) the story of draft dependency; (7) how to sell their husbands; (8) part-time work available.

4. Indirect pressure was brought to bear through a forceful USES letter calling for a definite prospect interview at a specified date and time in the USES office. This letter started out "Your name has been submitted to us as one who can contribute to the war effort." It called for an interview at a specified time and date and inclosed a special prepaid return card asking each person to state a definite "reason" if she could not keep the appointment. Recruiters were also equipped with a special portfolio that stressed the "Eventually, why not now" angle; with adequate training to eliminate objections and detect alibis, they were extremely effective.

5. Systematic referral of workers to war plants developed complete cooperation. At the start of the campaign each plant submitted tentative labor-demand schedules. These schedules showed the need by two-week periods, and workers were allocated on a proportionate basis according to these schedules. The number of recruiters furnished by each plant was also based on the labor-demand schedule that had been compiled by the plant.

6. Campaign cost was equitably apportioned among the plants. Total publicity cost was $4000. In addition, each plant paid the cost of its own field recruiters (approximate average earnings while in the field). Letters and clerical costs were provided by USES and the Chamber of Commerce. Publicity costs were allocated at the end of the campaign to each participating plant on a proportionate basis of the total number of women secured during the campaign.

USE THE *RIGHT* LATHE FOR EVERY JOB



MOTION PICTURES ON LATHE WORK

Two new 16 mm sound films in full color are available on a free loan basis for lathe apprentice training in the war industries.

Professionally filmed in our own factory under the direct supervision of competent lathe operators, these pictures clearly show the basic principles of engine lathe operation.

Showing time for each film is approximately 20 minutes. Write today for complete information.

Time, material and manpower can be saved for vital work if you use the *right* lathe for every job. The matching of the job and the lathe has never been more important than today—in no other way can maximum production be obtained. There is no place in our war production effort for slow, obsolete machines of questionable accuracy.

This is proved every day in hundreds of war plants where competent engineers have matched jobs with South Bend Lathes. Their speed, accuracy and ease of operation increase output, hold close tolerances, and conserve manpower for more efficient production.

There is a South Bend Lathe for practically every class of machine work. Toolroom Lathes and Engine Lathes are built in five sizes: 9″, 10″, 13″, 14½″, and 16″ swings. South Bend Turret Lathes are built in two sizes: Series 900, and Series 1000. A wide selection of attachments, accessories and tools are available for special classes of work. Write for information, specifying size and type of lathe in which you are interested.

ARMY E NAVY

TRADE MARK SOUTH BEND ENGINE LATHES

SOUTH BEND LATHE WORKS

SOUTH BEND, INDIANA — LATHE BUILDERS FOR 36 YEARS

EVERY STEP *is a* SURE STEP

play safe.. with

WETORDRY Safety Walk

REG. U. S. PAT. OFF.

MINERAL COATED FABRIC for all non-slip purposes

Many war plant accidents can be avoided by using WETORDRY Safety Walk applied with 3-M Safety Walk ADHESIVES, thereby saving needed man hours.

WETORDRY Safety Walk is a flexible mineral coated fabric available in convenient size roll form. It is long wearing, non-slip and easily applied by the average workman.

WETORDRY Safety Walk is now being widely used in those places where previously rubber, loose grain and cement or other non-slip materials have been used. Stair treads, catwalks, runways or around machinery in the plant, on aircraft, tanks and ships are but a few places where it is used today.

You may have a problem where our sales engineers could aid you with the use of this material. Why not fill in the coupon below and give them an opportunity to do so.

3-M SAFETY WALK ADHESIVE

This adhesive is but one of several hundred made by us today and is made specially for attaching WETORDRY Safety Walk to wood, canvas covered plywood or metal.

MINNESOTA MINING & MANUFACTURING CO.

SAINT PAUL, MINNESOTA

We would like to use WETORDRY Safety Walk as follows:.....

.....

.....

Please send information.

Company.....

Address.....

City..... State.....

FM&M 443

OTHER 3-M PRODUCTS AIDING WAR PRODUCTION

- 3-M Abrasive Paper and Cloth Products.
- "SCOTCH" Tapes.
- 3-M Adhesives.
- 3-M Wax and Sealer.
- 3-M Lapping and Grinding Compounds.
- 3-M Cutting and Finishing Compound.
- 3-M Fibre Gaskets.

Management Shorts

(Continued from page 70)

Goodyear Tire & Rubber Company has established, in addition to its ordinary safety precautions, an industrial hygiene division in its safety department. Functions of the new division are:

1. To obtain ventilation to provide working areas that are non-toxic.
2. To insure proper protection to lessen possibilities of dermatitis.
3. To obtain up-to-date information about all solvents and substances used.
4. To check fume areas at varying times.
5. To keep close check on all cases reporting to the hospital.

With the employment of large numbers of women in industry, various new problems are developing which demand immediate solution. Probably the most current hazard in the aircraft industry among women is the fact that few workers provide proper protection for their heads. There is a tendency towards an increased number of accidents caused by women's hair becoming caught in portable hand drills and other moving machinery. At Goodyear Aircraft Corporation each woman worker wears proper headdress, approved by the safety department, before she goes to work.

•

Wire Guard Protects Driver on Lift Truck

By piling materials on flats and elevating them with lift trucks into tiers three and four layers high, The Paraffine Companies, Inc., San Francisco, made use of much available storage space.

But this answer to the storage problem

Canopy-like wire guard protects lift truck driver from falling objects

Against the Avaricious Enemy... TIME!

The life of a gun in battle is short. The useful span of a bucking jeep is measured in hours. No more is expected... it's the fortunes of war. In another battle, here at home, we're fighting with machines that *CAN'T* be readily replaced... their working life must run into untold hours to keep up the steady flow of armament our fighting men need. So, their enemy is TIME. TIME, that bombards them with tortuous hours of wear. Here, as on the battlefronts, Ball Bearings play a mighty part in keeping the "wheels" turning. Without Ball Bearings, TIME would bring our vast war industry to its knees. The Fafnir Bearing Co., New Britain, Conn.

ARMY E NAVY

FAFNIR

BALL BEARINGS

THE BALANCED LINE - FOR ORDNANCE, AIRCRAFT AND INDUSTRIAL MACHINERY

LINK-BELT SPEEDER MACHINES CAN SAVE YOUR PLANT MANY MAN HOURS!

Speeds Up Handling of Hard-To-Handle Materials!

Link-Belt Speeder machines are coming in mighty handy in plants throughout the country—saving man power and cutting down on the time required to handle materials that are big and bulky or hard-to-handle, whether it's hook or bucket work. These finger-tip-controlled machines are pointing the way to new economies in time and money. Both are essential today!

9090

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)

also turned out to be a definite safety hazard. The drivers of the lift trucks were unprotected from falling materials. Several drivers were struck on the head and shoulders by falling objects and seriously injured.

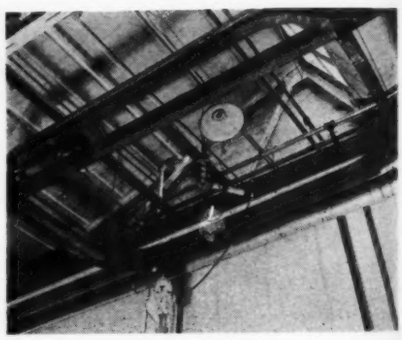
To protect the men, sturdy guards, like the one shown, were improvised from steel tubing and heavy wire, and erected over the driver's seat. The safety device for carrying off exhaust fumes into the air above the driver's head was allowed to protrude through the wire. With this protective screen the driver could still see to maneuver his lift, yet work in complete safety. Since the installation of these guards, there have been no accidents on the 14 lift trucks now in operation in the plant.

•

Revolving Collector for Hoist on Loop Track

The illustration shows how the problem of operating an electric hoist on a continuous circular track without backtracking was solved at the plant of the Jones & Lamson Machine Company, Springfield, Vermont.

A 6-in. standard I-beam trolley rail with a half-ton hoist was installed to serve degreasing equipment. One side of the rail



Revolving collector permits electric hoist to travel in either direction around rectangular track

is centered over two degreasers, while the parts to be cleaned are placed at the left end. Work is picked up, moved along the near side of the rail, and around the turn to the back side, passing through the two degreasers in a counter-clockwise direction.

In order to operate the hoist in this manner, a revolving collector was made by the electrical department. This collector hangs from a structural channel bolted to the lower flange of the I-beam supporting the trolley rail. The collector consists of a steel-centered wooden shaft hung in vertical postition from the channel iron. Three bronze collector rings are mounted on the shaft in a horizontal position by three vertical pieces of insulating fiber, which separate the rings from the wood shaft. These rings are conected to a three-phase, 60-cycle, 220-volt circuit.

At the bottom end of the shaft there

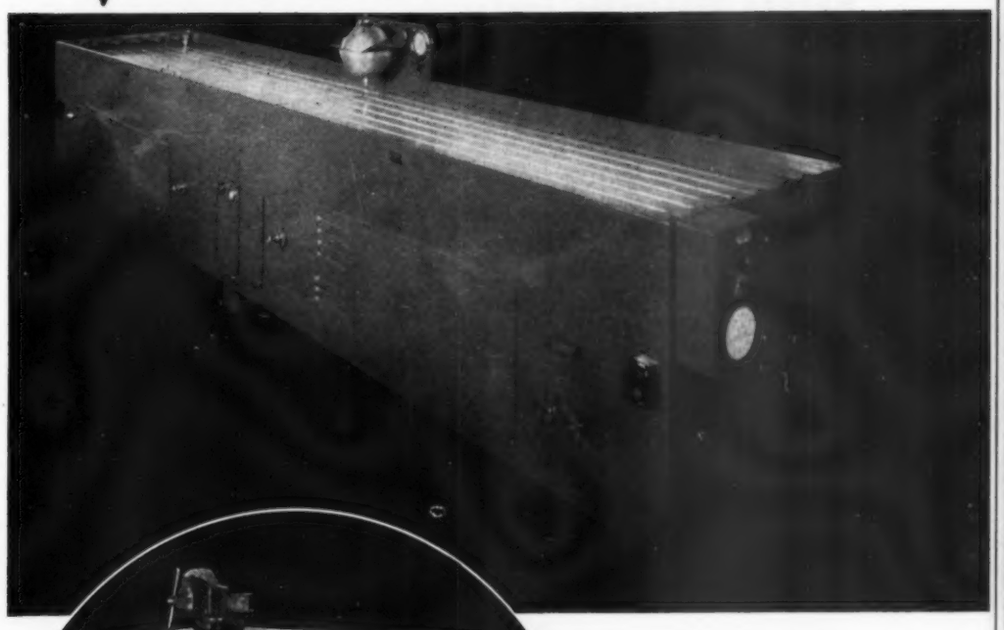
for checking — HYDRAULICS
BEFORE & AFTER ASSEMBLY

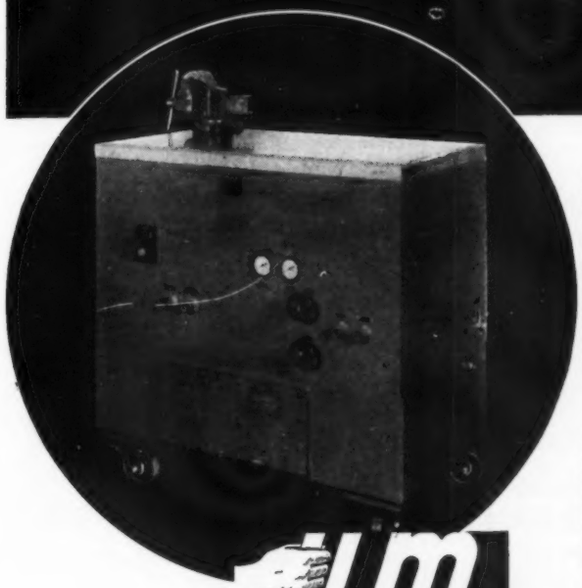
Besides the two models illustrated—there are many other "HY-MAC" test units for various purposes in the field of aircraft. Here is a brief description of a few others:

T-103 **Stationary Hydraulic High Pressure Tube Tester—primarily designed for testing flexible tubing but also used for checking short sections of plain metal tubing . . . as many sections as required may be tested at a time . . . the Hydraulic Pump is capable of a 1000 lb. per square inch pressure that may be built up to a 10,000 lb. per square inch pressure by means of a built-in intensifier.**

T-104 **Water Pressure Test for Aircraft Cylinder Heads. . . . Heads are clamped into position on a trunnion that may be rotated for inspection. It is operated by a Hydraulic power plant capable of producing 1000 lb. per square inch, which is supplemented by a high pressure hand pump or intensifiers to accomplish whatever pressure is required. All of the mechanism is enclosed.**

Send for complete information regarding "HY-MAC" HYDRAULIC TEST EQUIPMENT.





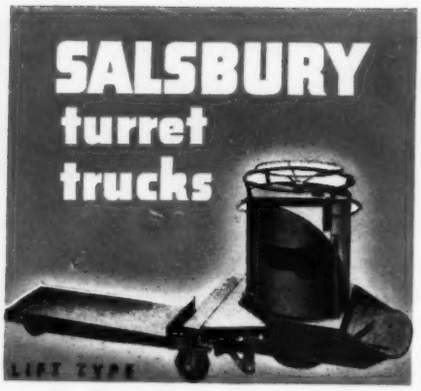
T-102 Principally used for checking aircraft tubing this stationary Hydraulic Test Bench with a variable test pressure ranging from 0 up to 10,000 lbs. per square inch and a variable delivery pumping unit 0-12 gal. per minute—is used to test anything in the line of hydraulic equipment before its assembly into aircraft.

T-101 Portable Hydraulic Test Bench is used for pre-flight checking of the hydraulic circuits of planes—for checking all of the hydraulic functions without running the airplane engines. It may also be equipped with a gasoline engine driven pump for field testing.

HYDRAULIC MACHINERY, INC.
12825 FORD ROAD • DEARBORN, MICH.

Hy-Mac

HYDRAULIC MACHINERY



Speed War Production by Moving Needed Materials Faster, Easier and With Less Manpower

Get more productive hours from your manpower and equipment by using Salsbury Turret Trucks for moving materials within your plant. One man can do the work of three, machines are kept humming, production climbs, and material handling costs *go down!*

Salsbury Turret Trucks are fully automatic, easy to maneuver, safe and simple to operate and are low in first cost and operating cost.

Fast, sturdy and powerful, these low-cost industrial power trucks are available in three models—lift, cargo and tractor. Each is designed to handle your specific materials transportation most efficiently and economically. Write Dept. T-1 for illustrated bulletin, prices.

Manufactured and Distributed By
NUTTING TRUCK AND CASTER COMPANY
Faribault, Minnesota
Under license of Salsbury Corporation, Los Angeles

SALSBURY turret trucks

is a steel disk mounted on a ball bearing. Attached to this bottom plate are two insulating fiber strips that hold the bronze brushes which make contact with the stationary collector rings, and a wooden arm that supports the flexible cord supplying the hoist. The brush-holders are held in place by a fiber insulating plate at the top. The ball bearing at the bottom of the shaft makes it possible for the contact brushes (and the cord) to revolve about the collector rings.

•

Gage Checking Trucks Tour Plant, Save Time

SOURCE—Campbell Wood, General Manager Propeller Division, Nash-Kelvinator Corporation, Lansing, Mich.

Trucks that carry gage checking equipment and travel through the plant to the point of operation save an estimated 1000 man-hours daily. Since workers do not

Truck traveling the plant with gage checking equipment saves man-hours

have to bring their gages to a central checking station at regular intervals, the use of the trucks means that each man saves approximately an hour's time per shift.

Five such trucks are in operation, working three shifts 24 hours a day covering the production and inspection departments. The plant has about 35,000 gages in use and 5400 varieties. The trucks check approximately 7000 gages daily.

Each truck, specially designed, carries one gage amplifier; a dial indicator; 12x12 surface plate; set of master gage blocks; set of depth micrometers; two sets parallels; steel square; hardened and ground V block; two test bars for setting; 10-in. height gage, set of 1- to 12-in. micrometers; and miscellaneous accessories such as hones, sealing wax, and alcohol torch.

•

When an employee of the Permold Company, Medina, Ohio, takes a day off without any ap-

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Any leather belt will outlive a rubber V-belt on a corresponding pivoted motor drive (see "Fifty Reports on Mechanical Power Transmission from Motor Drive to Industry" — Robert Drake). And *Research* Leather Belting gives you the best in leather — that's why more pulleys are turned by Research than by any other brand.

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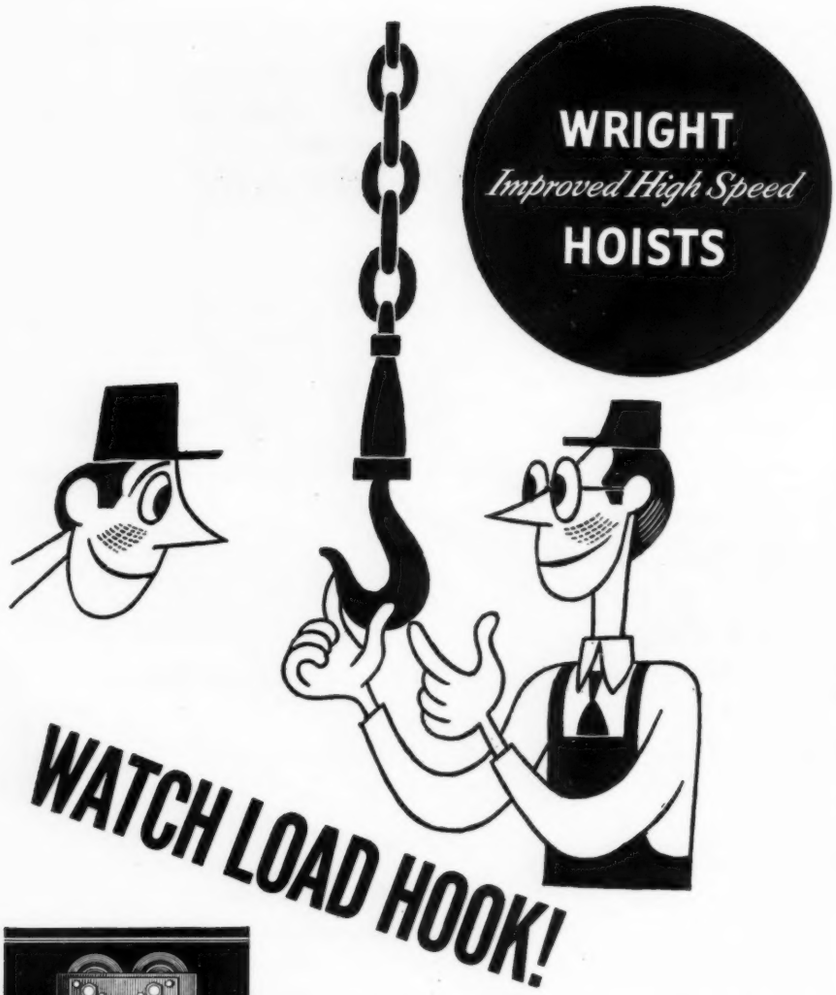
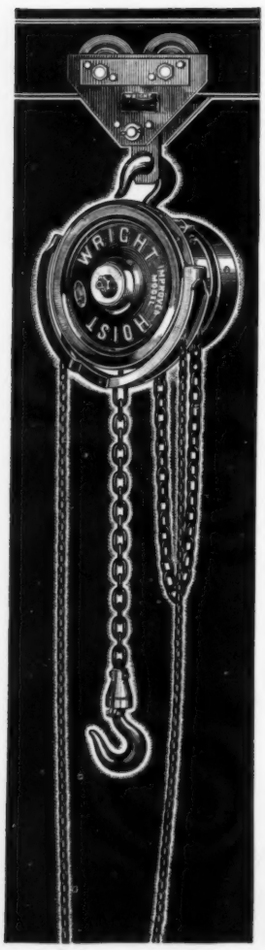
Only leather belting manufacturer with complete nation-wide service facilities. Branches in Chicago, Cleveland, Dallas, Detroit, Kansas City, Minneapolis, New York, Philadelphia, San Francisco. See adjoining column for distributors (also listed in THOMAS' REGISTER.)





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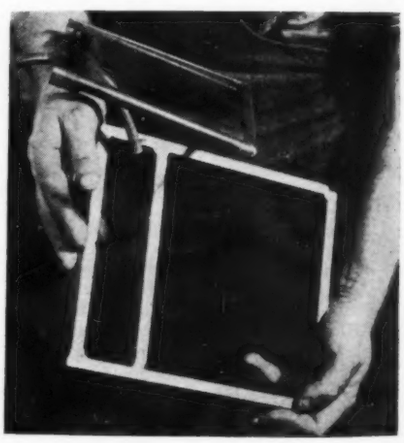
parent good reason, he finds mixed in with his pay a quantity of German marks. A note accompanying the pay explains that a day off is a day for Hitler, hence the remuneration from "der fuehrer."

•

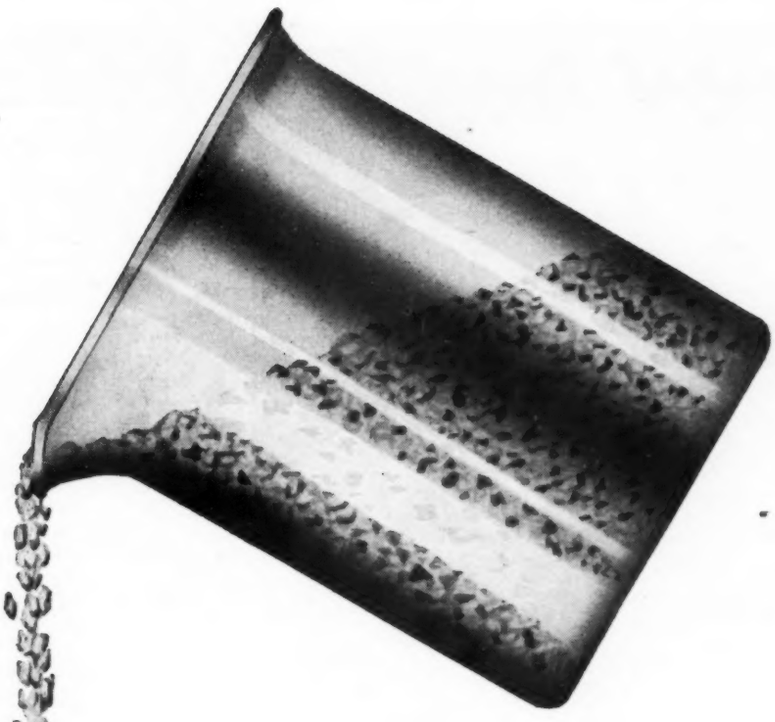
Safety Devices for Workers' Protection

Safety devices play an important role in helping to cut accidents in war plants, despite increased employment. They conserve manpower by protecting the eyes and hands of war workers.

Bar sweeps operator's arms out of harm's way of the closing press converted for cutting dies for thin materials in a Westinghouse plant. The operator's hands are automatically cleared of the closing press by the upward swing of the moving bar under his arms



Glass guard installed over air blower for cleaning metal frames of chips, shields the workman's eye from small bits of flying metal at a Westinghouse war plant producing tank equipment. Air under pressure is used to clean the metal frame of fine scraps and chips after it has been machined



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BOOKS

TEXTBOOK OF OFFICE MANAGEMENT

W. H. Leffingwell, late president National Office Management Association, and E. M. Robinson, professor of management, Boston University College of Business Administration. McGraw-Hill Book Co., 330 W. 42nd St., New York. 409 pages. Drawings, forms, graphs, index. $3.

Second edition. The office manager's task is to get office work done well, quickly, and at reasonable cost. This book is aimed at training men in analyzing of office requirements, planning and laying out the work, selecting competent workers, directing them, and controlling office operations. Nearly 700 questions and 40 problems are presented to provide the student with the opportunity to test himself and his knowledge.

GRINDING WHEELS AND THEIR USES

Johnson Heywood, under the auspices of the Grinding Wheel Manufacturers Association. Penton Publishing Co., Penton Bldg., Cleveland. 436 pages. Photographs, drawings, index. $3.

Second edition. A handbook and textbook on modern grinding practice and theory. Considerable stress is laid on typical ingenious kinks for solving various problems. Suggestions are presented for designing parts to permit their being ground instead of machined. For convenience, all tabular matter dealing with wheel recommendations for various types of grinding have been grouped together.

JOB INSTRUCTION

Vernon G. Schaefer, Ph.D., assistant professor of psychology in charge of supervisory training in industry, The Pennsylvania State College. McGraw-Hill Book Co., 330 W. 42nd St., New York. 316 pages. Drawings, forms, index. $2.50.

One of the series of books for use industrial classes. It outlines and discusses the fundamental principles of job instruction in language adapted to situations found in teaching adults how to do industrial jobs effectively.

BIBLIOGRAPHY OF TECHNICAL AND INDUSTRIAL MOTION PICTURES

Gilbert G. Weaver, supervisor, Industrial Teacher Training, State Education Department, New York State. The Hamilton Co., 225 Lafayette St., New York. 329 pages. $2.50.

List of 2300 motion pictures, slidefilms, and slides for use in vocational schools, technical colleges, and industry, that can be bought, rented, or borrowed. Items are described and classified under appropriate headings for easy reference.

TIMESTUDY FOR COST CONTROL

Phil Carroll, Jr., M. E., management consultant, New York, McGraw-Hill Book Co., 330 W. 42nd St., New York. 301 pages. Charts, drawings, index. $3.

Second edition, with foreword by C. D. Dyer, Jr., president, Dyer Engineers Inc., Cleveland. A manual for industrial engineers and shop executives who wish to understand time study methods in order to plan the installation or improvement of a time study

HIGHER speeds, closer tolerances, increased pressure, higher operating temperatures—all make the selection of correct lubricants a specialized problem. ● Now, more than ever, the correct lubricants must be used if increased production, low maintenance cost and maximum performance are to be obtained. ● The National En-Ar-Co White Rose Oils and En-Ar-Co Greases for all industrial purposes are complete and of the highest quality. These lubricants, engineered to meet every specialized requirement, are winning new laurels for outstanding performance where National recommendations have been followed. ● The National Refining Company maintains a staff of competent engineers and chemists who will be glad to work with you in maintaining your plant and equipment at its wartime best.

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system. Explains applications and advantages of time study based on predetermined standards, outlines a practical method of completing time study measurement and control of cost without rearranging the shop.

SOCIAL ASPECTS OF INDUSTRY

S. Howard Patterson, A.M., Ph.D., professor of economics, Wharton School, University of Pennsylvania. McGraw-Hill Book Co., 330 W. 42nd St., New York. 536 pages. Forms, charts, index. $3.

Third edition. General survey of social problems in industry for courses in which emphasis is placed on the social and economic aspects. Non-technical in treatment. In six parts: Background of Labor Problems; Problems of Income; Human Conservation and Labor Legislation; Collective Bargaining and Labor Organizations; The Approach of the Employer; Comprehensive Problems of Economic Reconstruction.

•

BOOKLETS

JOINT PRODUCTION COMMITTEES IN GREAT BRITAIN. Studies and Reports, Series A (Industrial Relations) No. 42. International Labour Office, 734 Jackson Place, Washington, D. C., 74 pages. 50c.

WORKERS AND BOSSES ARE HUMAN, Collective Bargaining at Work. Public Affairs Pamphlets No. 76. T. R. Carskadon, Public Affairs Committee, Inc., 30 Rockefeller Plaza New York. 32 pages. Charts, bibliography. 10c.

FIRST STEPS UNDER CMP. Prepared by The Research Institute of America, 292 Madison Ave., New York. 29 pages. $2.

TESTED WAYS TO REDUCE ABSENTEEISM. Reprinted from regular issues of FACTORY. McGraw-Hill Publishing Co., 330 W. 42nd St., New York. 20 pages. Photographs. 25c.

•

ON THE CALENDAR

APRIL

9–10, Midwest Power Conference, Palmer House, Chicago. Stanton E. Winston, Conference Director, Illinois Institute of Technology, 3300 Federal St., Chicago.

12–16, American Chemical Society, Semi-Annual Meeting, Detroit. Alden H. Emery, Assistant Manager, 1155 Sixteenth St., Washington, D. C.

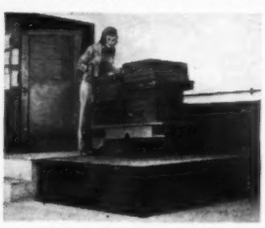
13–16, American Management Association, Packaging Conference, Astor Hotel, New

GLOBE LIFTS SOLVE PLANT MANPOWER PROBLEMS

Oil-Hydraulic Power Replaces Manpower for Lifting, Loading

Globe Oil-Hydraulic Platform Lifts are speeding production in many war plants today. Illustrated below are a few of the typical uses for these husky, smooth-operating, accurately-controlled lifts . . .

Lifts between Two Floor Levels . . .

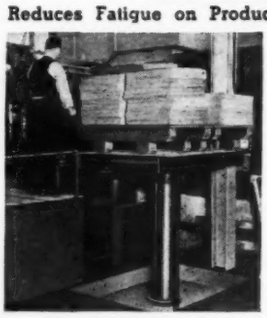


Loads roll quickly, easily from one floor level to another across this Globe Oil-Hydraulic Platform Lift.

Speeds Shipping and Receiving . . .

Globe Lift installed in driveway outside shipping room makes truck-loading a one-man job.

Reduces Fatigue on Production Line . . .



Stock pile for machine feeding is always at convenient working level on this Globe Lift. Eliminates stooping or awkward, tiring motion. Speeds output.

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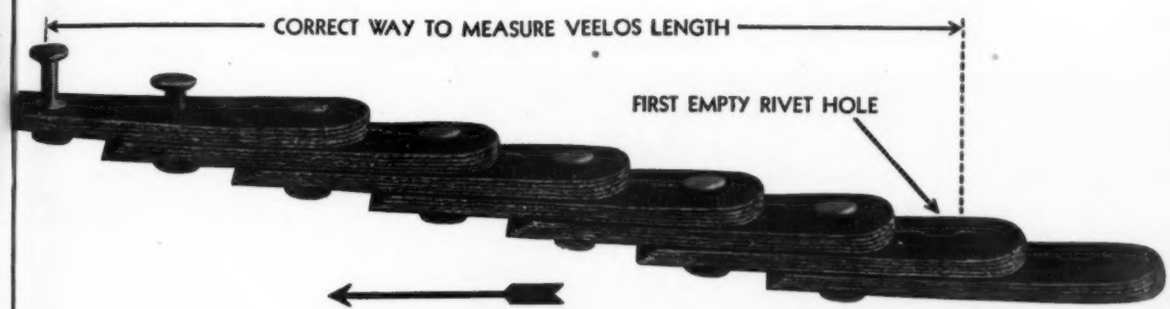
TO VEELOS FOR GREATER OUTPUT!

Veelos drives are peak production drives . . . because Veelos is the proved and practical link V-belt. Construction of the Veelos link permits installation and adjustment with a minimum of time and effort . . . assures smooth running. "Link up" your production with Veelos and speed ahead!

HOW TO MEASURE VEELOS



Arrow shows preferred direction of belt travel, although Veelos runs equally well in either direction. On V-flat drives, reverse the direction of travel.

To make a matched set of Veelos V-belts, measure one belt from end rivet to first empty hole as shown in diagram. Make all strands with the same number of segments. *The length of a Veelos belt should be 1" per foot shorter than the pitch length of the drive.* For "D" and "E" sizes, however, shorten only 3/4" per foot.

When desired belt length falls at some point between two rivets, use the rivet which most closely corresponds to the desired length. Veelos' resilience compensates for the fractional difference.

To shorten Veelos belt, simply remove links.

VEELOS

THE LINK

V-BELT

ADJUSTABLE TO ANY LENGTH

ADAPTABLE TO ANY DRIVE

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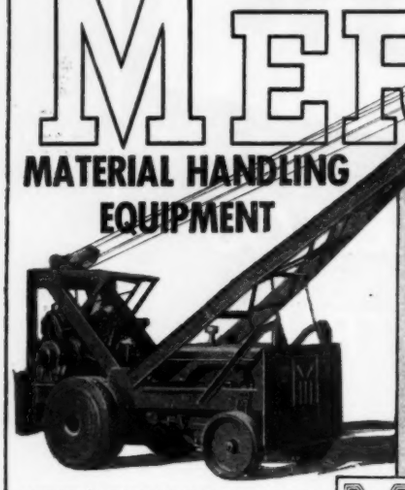
"THE NAME THAT CARRIES WEIGHT"

MERCER

MATERIAL HANDLING EQUIPMENT



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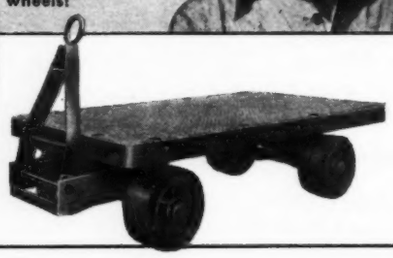

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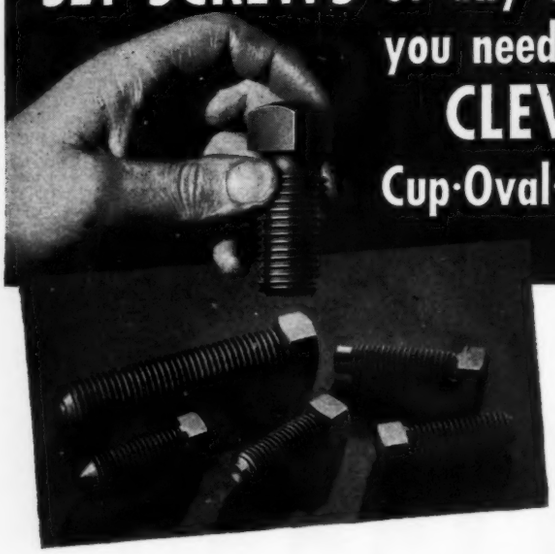

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York. James O. Rice, Assistant Secretary, 330 West 42nd St., New York.

20–23, National Electrical Manufacturers Association, Spring Meeting, Palmer House, Chicago. R. J. Blais, Convention Manager, 155 East 44th St., New York.

26–28, American Society of Mechanical Engineers, Spring Meeting, Black Hawk Hotel, Davenport, Iowa. C. E. Davies, National Secretary, 29 West 39th St., New York.

27–29, Chamber of Commerce of the United States, 31st Annual Meeting, Waldorf-Astoria Hotel, New York. Ralph Bradford, General Manager.

28–30, American Foundrymen's Association, 47th Annual Meeting, Hotel Jefferson, St. Louis. American Foundrymen's Association, 232 West Adams St., Chicago.

29, Association of Consulting Management Engineers, Inc., Spring Meeting, Chicago. Nathaniel W. Barnes, Executive Secretary, 347 Madison Avenue, New York.

MAY

5–6, American Management Association, Production Conference, Hotel Statler, Cleveland. James O. Rice, Assistant Secretary, 330 West 42nd St., New York.

6–7, American Leather Belting Association, National Meeting, Hotel Commodore, New York. E. R. Rath, Executive Vice President, 53 Park Row, New York.

10–11, American Institute of Chemical Engineers, Semi-Annual Meeting, Waldorf-Astoria, New York. Stephen L. Tyler, Secretary, 50 East 41st St., New York.

10–14, National Fire Protection Association, Annual Convention, Palmer House, Chicago. Percy Bugbee, General Manager, 60 Batterymarch St., Boston.

24–26, National Association of Purchasing Agents, Annual Meeting, Waldorf-Astoria, New York. G. A. Renard, Secretary, 11 Park Place, New York.

26–27, National Metal Trades Association, Production Conference, Palmer House, Chicago. Charles L. Blatchford, Assistant to the Commissioner, 122 S. Michigan Avenue, Chicago.

JUNE

14–16, American Society of Mechanical Engineers, Semi-Annual Meeting, Biltmore Hotel, Los Angeles. C. E. Davies, Secretary, 29 West 39th St., New York.

21–23, National Association of Cost Accountants, Annual Meeting, Statler Hotel, Boston. Dr. S. C. McLeod, Secretary, 385 Madison Ave., New York.

21–25, American Institute of Electrical Engineers, National Technical Meeting, Cleveland. H. H. Henline, Secretary, 33 West 39th St., New York.

25, Association of Consulting Management Engineers, Inc., Meeting, Cleveland. Nathaniel W. Barnes, Executive Secretary, 347 Madison Ave., New York.

28–July 2, American Society for Testing Materials, 46th Annual Meeting, Hotel William Penn, Pittsburgh. R. E. Hess, Assistant Secretary, 260 S. Broad St., Philadelphia.

This may look funny—

BUT IT'S MIGHTY SERIOUS

Current news reports apply a fun-making name to some mighty serious troubles that have bothered production, assembly and maintenance men right along.

These reports say that army ground crews are cursing the "MECHLINS," second cousins of the notorious "Gremlins." "Mechlins" are trouble makers for men who handle wrenches.

Shown here is that troublesome Mechlin, "SPECIALITUS," who provokes a mania for making special tools for every odd job whether necessary or not. Blackhawk's completely interchangeable socket wrenches put this guy out of business. No need to waste time making special wrenches — when one standard set of Blackhawk Socket Wrenches makes *thousands* of combinations. Most important, Blackhawk's exclusive Thumb-Release "Lock-On" clicks each combination into a sólid tool! Many other features combine to make Blackhawk Socket Wrenches the modern answer on complicated assembly, service and maintenance jobs.

***A Product of* BLACKHAWK MFG. CO.**
Department W2143 • Milwaukee, Wisconsin

Here's a tight-squeeze job for which Mechlins would tempt the design of a special tool. This is a waste of time and expense when a standard Blackhawk Socket Wrench combination will handle the job better, faster and easier.

Save your engineers' time. Check the Blackhawk Wrench Catalog before having them design costly special tools.

MEET THE MECHLINS
This interesting, informative new booklet tells you how to lick all the troublesome Mechlins. Get it from your Industrial Jobber — or send the coupon TODAY.

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WRENCH SPECIALISTS

BLACKHAWK MFG. CO.
Dept. W2743, Milwaukee, Wisconsin

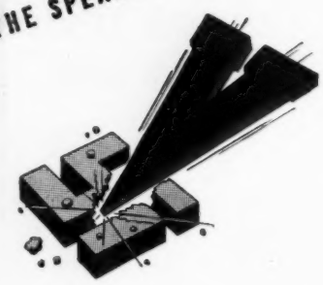
Rush your free booklet:
"MEET THE MECHLINS"

Name.....

Company.....

Address.....

Metal Shapes—
THE SPEARHEAD OF VICTORY



Slowly the Axis crumbles under the relentless blows of America's war implements — implements which RITCO is proud to help build.

For over a century, in wars and peace, we have been working in metals, solving the special problems of customers in many industries. Let our long experience and complete equipment help you in your production problems of today — and tomorrow.

Remember RITCO for—

SPECIAL BOLTS, NUTS AND STUDS

DROP FORGING AND DIE SINKING

SCREW MACHINE PRODUCTS

HEAT TREATING

SPRAYED METAL SERVICE

Estimates gladly submitted. Send samples or blueprints. Catalog on request.

RHODE ISLAND TOOL COMPANY
148 West River St.
Providence, R.I.

Serving American Industry Since 1834

RITCO

THEY SAY AND DO

Protection of Eyesight a War-Industry "Must"

The importance of workers' eyesight and the prevalence of injury to eyes in industry are being spotlighted by the war effort.

According to a report from National Society for the Prevention of Blindness, 1790 Broadway, New York, recognized methods of protecting eyesight are being overlooked, in contrast with the widespread provisions of general safety measures. Based on a study of 50 typical plants employing about 167,000 workers, the report, made by Charles P. Tolman, consulting engineer for the Society, calls attention to an estimate that at least 25 percent of industrial workers have defective, but correctible, vision. Practically all the plants investigated are carrying out faithfully most general safety procedures, but more than three-fourths indicated that they make no effort to determine what visual requirements are necessary or acceptable to qualify a worker for any particular job.

"This means," the report explains, "that these plants do not know how many color-blind or one-eyed men, or men with subnormal but correctible vision, can be utilized."

Only 14 percent of the plants arrange for periodic eye examination of workers who are especially exposed to hazards. "This is a serious oversight," the report states, "because some industrial eye injuries are cumulative—for example, those due to intense radiation as in welding and furnace work."

Although most authorities agree that the majority of industrial eye injuries can be prevented simply by wearing goggles or other protective equipment, this precaution is not always taken. "Eighty percent of the plants claim to supply goggles to workers whom they consider exposed to hazards," the report continues. "This figure is doubtless in excess of the fact, because some exposures are frequently not recognized. For example, some front-rank plants do not consider that a lathe operator is exposed to eye injuries. Only 70 percent fit goggles for the comfort of workers, and more than a third of the plants fail to sterilize the goggles before issuing them to be worn by other workmen."

Eye-Saving Program

A move to check the number of eye injuries among workers has been made by Secretary of Labor Perkins by the creation of a special Eye Saving Section as a part of the National Committee for the Conservation of Manpower in War Industries. Harry Guilbert of Chicago, director of safety for the Pullman Company, is chief of the new section.

"Eye injuries not only cause a substantial part of the temporary time losses due to work accidents, but also in thousands of cases they result in permanent loss of vision, either total or partial," says Secretary Perkins. "At the same time, experience has demonstrated that traumatic injuries can be prevented almost entirely by the consistent use of protective lenses and adequate control of operating hazards.

"While there are no figures showing precisely the extent of increase in accidents causing eye damage, observation of the Department's safety experts in more than 20,000 war plants during the past two years indicates a substantial increase in the volume of this type of traumatic injury. In one plant employing 30,000 workers the record reveals 1750 eye injuries occurring in a single recent month, 62 of them being described as serious."

The work of the new section will be directed first to assisting war production plants where the frequency of eye accidents has materially retarded production schedules.

•

How Britain Runs War Production Drives

Again—and again with profit—we are able to compare some phase of our war effort with British experience in the same field. This time it is the War Production Drive that can be examined in the light of our ally's richer experience.

This comparison is made possible by James T. Chirurg, Boston advertising man, who, after watching the beginning of War Production Drives in this country, was convinced that England's experience in the past two or more years could help American war manufacturers facing the same manpower and production problems that England had already met and solved. Chirurg was able to go to England at the invitation of the British government. And there, with the cooperation of government officials, he studied at first hand British use of the printed and spoken word to increase worker output. His conclusions were recently presented in an address before the Textile Society of Canada in Montreal.

"What we call 'War Production Drives' in American industry," he said, in part, "have in England evolved into broad, coordinated, educational programs for all war workers—plant, clerical, managerial—describing *what* is going on and explaining *why*. Information, rather than inspiration, is the keynote.

"England has found that production should not be a subject for hysteria . . . Straining for increased output is often followed by a let-down, or by increased accidents or absenteeism. A well-prepared, continuous educational program, on the other hand, gives the worker a clear understanding of his place in a nation at war. Production is pushed up more

NO "ABSENTEE POWER"

when WHITNEY CHAINS take it to the Job

PROTECT Chain Life

Keep sprockets properly aligned... chains properly lubricated. And inspect all drives regularly, to Keep 'Em Rolling longer.

Every bit of power goes all the way to work . . . and gets in its full licks on production . . . when it travels via Whitney Roller Chain. For these stout chains are today's No. 1 "armored transports" of power from prime mover to the production front. They resist the raids of slippage. They fight off friction loss. They keep speeds constant. And they have the extra toughness that extra-strenuous wartime operation demands. So whenever you need a new power drive, get the ones that will keep production up for the duration. Get Whitney Roller Chains . . . the Victory Drive.

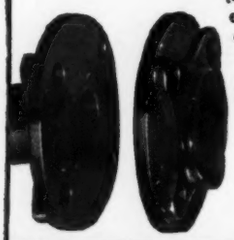
The WHITNEY CHAIN and Manufacturing Co.

HARTFORD, CONNECTICUT

"and Hodgman Saran solved our problem"

When the history of this period is written, this is what many firms will be able to say.

HODGMAN SARAN TUBING, PIPE AND FITTINGS are more than substitutes—they are permanent replacements for strategic materials such as copper, brass, steel, aluminum, rubber, etc. and deserve a thorough investigation by your engineering department. . . . Write today for technical data sheet and free sample.



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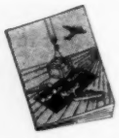
It keeps Maintenance DOWN



Let this useful booklet show you how to get special hoist equipment for your needs at "standard equipment" cost. *Modern Materials Handling Magic* shows WHY Reading Hoists provide easy maintenance. Write on your company letterhead for your copy.

● From dye houses like this to steel mills and paper plants, *Reading Electric Hoists* are helping to keep production up every hour of the day. Many *Reading Hoists* installed 10 or 15 years ago are *still* helping to speed production and keep maintenance down.

● When you are faced with a tough handling problem—or when you want "standard equipment" that will do the job well—it will pay you to rely on Reading's engineering ability.

Reading Chain & Block Corporation, 2103 Adams St., Reading, Pa.

READING CHAIN HOISTS-ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

slowly, but it can be kept there more consistently.

"It has been found, too, that for a program of this kind to be successful, there must be active employee participation of all the workers. Every opportunity to discover new ways to build up employee participation should be explored, and, above all, every opportunity to give proper and public recognition for extraordinary effort on the part of the individual worker should be taken . . .

"It has been found that informal talks by men back from active duty . . . are more effective than management tours by ordnance and procurement officials. The Ministry of Supply has furnished speakers to over 2000 factories during the past 15 months . . . Many firms that service speakers have visited have reported immediate results.

"Groups of workers are also sent to visit fighter-trainer stations of the RAF. The trip is made as a reward for outstanding work in cutting down scrap, absenteeism, etc. The workers, not exceeding ten in number, are chosen on the basis of merit . . . They talk to their fellow-workers enthusiastically about the visit for weeks after their return, and bring back first-hand information about the base and about the product they are making . . .

"For smaller plants, where it might not be practical to send service speakers, the Minister of Aircraft Production makes available recordings by pilots telling of their experiences on patrol or in combat. These are broadcast to workers, usually during mealtime, and get good response. This is but one instance of effective use of the public-address system in the plant morale program.

See Their Own Work

"Posters that present a particular type of plane, tank, or other piece of equipment on which the product of that particular plant is used are very successful. A photograph of the part made in the plant is superimposed so that workers can identify their own work. News flashes reporting the achievements of these weapons or current action in which they took part are often shown with these posters.

"To avoid 'over-posterization,' which dulls interest, all posters in the plant may be taken down for a week. Then a teaser announcement about the new posters is made over the public-address system. This builds up curiosity, anticipation, and fresh interest. The workers watch for the new posters and study them more intently when put up.

"Many outstanding results have been noted from the use of production charts or targets. But they are more successful when confined to one particular part of the general production program, such as the reduction of scrap, etc. They are best when kept simple in design and used only in short periods . . .

"Special traveling exhibits have been set up by various government agencies in trailers which tour the important manufacturing centers so that workers have an opportunity to study the photographic exhibits and pieces of war equipment.

Smaller exhibits are sometimes furnished to be set up in the plants or local stores . . .

"Because of the paper shortage some factories use the bulletin board to publish the plant newspaper or house organ. News of social events, personal items of interest to the workers, and photographs are posted on the board . . .

"Films are used in British war plants much more extensively than they have been up until now in American plants. They are shown as part of the educational program and to provide a period of relaxation and entertainment which helps to combat the effects of monotonous work and long hours.

"If Britain's experience with production in war plants is to be used as a guide, music in industry is here to stay. Music is used very generally in the factories. It has been proved that music can act as a tonic to workers . . . and so increase production."

Although America is using some of these methods too, Chirurg pointed out that they were not being used to the extent they might be to maintain peak production in our war plants. He suggested looking with a more critical eye at what we are now doing.

"We should beware the idea that posters alone, whatever the source, can solve the problem of mental attitudes," he concluded. "We must avoid generalities and the danger of over-posterization. These are waste. We must, above all, abandon the constant straining for new competitive incentive schemes. Intense 'production drives,' unless short, and directed at one specific problem affecting production, may defeat their own purposes in the long run."

•

Does CIO Really Want Its Tax Plan?

No longer would America be a country of free enterprise but rather one completely government owned and government controlled, if the CIO tax program were put into effect, says Willford I. King, professor of economics at New York University.

If people studied the inner meaning and actual results of such a program, they would protest to their Congressmen more vigorously than they have ever done before, Professor King believes. In an open letter released through the Committee for Constitutional Government, Inc., 205 E. 42nd St., New York, he first states the major points of the tax program recommended by CIO, then proceeds to show what would happen if this program were adopted.

Under the CIO tax plan, the typical family having an income of less than $2300 would pay no federal income tax. The similar family with an income of $3000 would pay about $115. According to a recent estimate made by the U. S. Bureau of Labor Statistics, families having money incomes under $3000 comprise 81 percent of all families in the nation. Virtually, therefore, the CIO tax plan ex-

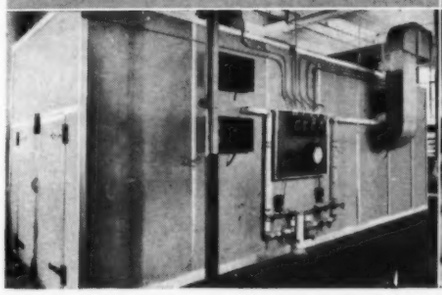
One of the major developments of wartime industry is the speedier adaptation of inexperienced manpower to the handling of exacting production operations. This is how it is done today in many warplants.

Every operation and process demanding critical temperatures, pressures or flow rates is reduced to simple routine by installation of precision Foxboro Measurement or Control Instruments. Automatically, workers are continuously supplied with exact measurements to guide them . . . graphic records are provided wherever needed . . . manual control is completely replaced in many instances. Each production step is so simplified that even "green hands" take hold *fast* . . . produce accurately, in paying quantity, after only brief training!

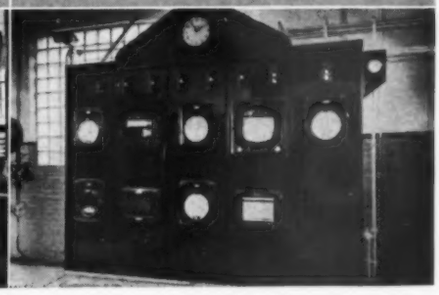
Make this note for post-war planning! "Investigate Foxboro Instrumentation as a means to improve production quality or efficiency." **The Foxboro Company, 24 Neponset Avenue, Foxboro, Mass., U. S. A.**

FOXBORO
Reg. U. S. Pat. Off.
MEASUREMENT AND CONTROL SYSTEMS

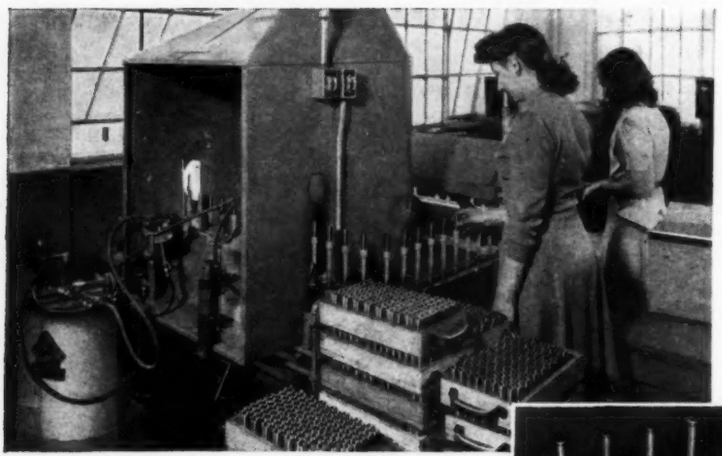
Typical installation of automatic Foxboro Control on dehydrator for speedy, uniform production of dehydrated foods.

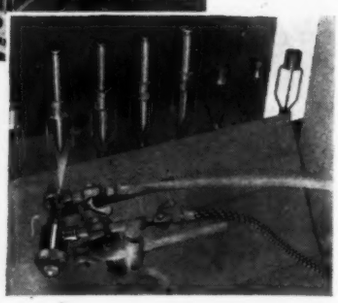


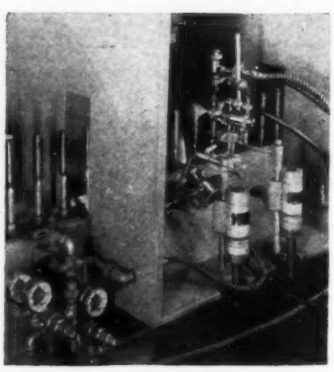
Foxboro Control developments in installations like this have made possible new techniques in aviation gasoline refining.



★ ★ Keen-eyed Inspectors must "PASS THE AMMUNITION" First







"Pass the ammunition" means more than just handing cartridges to a gunner. Inspectors must "pass the ammunition" at every step in the manufacturing processes, working to specifications which really split hairs. That is because military men know the slightest inaccuracy is multiplied many times as a shell travels toward its target.

The coating of shell cases is a precision job too, the film thickness tolerance being + or — .0001", and Paasche automatic airpainting equipment is doing the job in stride. In one plant, for example, 99.4 per cent of the finished cases are declared perfect and pass final inspection.

Inset above shows interior and exterior of 20 MM shell cases being coated automatically on a Paasche unit.

In the larger picture, an operator feeds the conveyor of a similar Paasche automatic machine which coats the 20 MM projectiles. Below, in a shell loading plant, a Paasche unit applies the final coating to the assembled shell.

Here, in the story of a 20 MM shell, you see illustrated the versatility of Paasche equipment, but you don't have to make shells to get the benefit of the inventive and creative ability of the Paasche organization. Their wide experience in developing airpainting units to improve quality, speed production and reduce cost of finishing, is available to you, without cost or obligation. Write for further information and literature on Paasche automatic or manual equipment.

PAASCHE AIRBRUSH COMPANY
1944 Diversey Parkway, Chicago, Illinois

Paasche AIRPAINTING EQUIPMENT

Manual, automatic and special airpainting equipment, airfinishing booths, pressure regulators, airconditioners for compressed air lines, air dusters and stripers.

empts from federal taxation four out of five persons who are earning money.

"Obviously," continues Professor King's letter, "one question to be considered is the possibility of securing from that 19 percent of recipients with incomes above $3000 revenue sufficient to meet governmental requirements. At present the government is actually spending more than $6,000,000,000 per month. All of the income of persons over $3000 is not sufficient to pay federal expenses even for four months out of the year.

"If the CIO tax program is adopted, the middle and upper income classes will obviously be brought down financially to the level of the skilled wage workers. This will automatically cut off the capital supplies needed to finance new enterprise . . . The CIO program also reduces corporate incomes to such an extent that the corporations cannot save out of earnings the funds needed for expansion, to say nothing of the vast sums required for reconverting their plants after the war.

"There will remain only one way out. The government will do the financing, and this will mean that government will own industry. When this happens there will be only one large producer of goods, only one large seller of goods, only one large employer . . . freedom of choice of work will be drastically limited. Everyone will take the job assigned to him and like it or lump it. Incidentally, labor unions will perforce disappear from the picture. Has this fact been realized by CIO leaders?

"CIO leaders know full well that the quadrupling of real wage rates in the United States during the last century has not been due to the expenditure of more effort by the wage workers, but, instead, has been brought about by the investment in skillfully managed enterprises of $5000 to $10,000 of capital per employee . . . Are these leaders in favor of a tax program which will destroy the set-up that has given us by far the highest real wage level existing in the world, and which is making possible victory over the combined forces of Hirohito, Mussolini, and Hitler?"

•

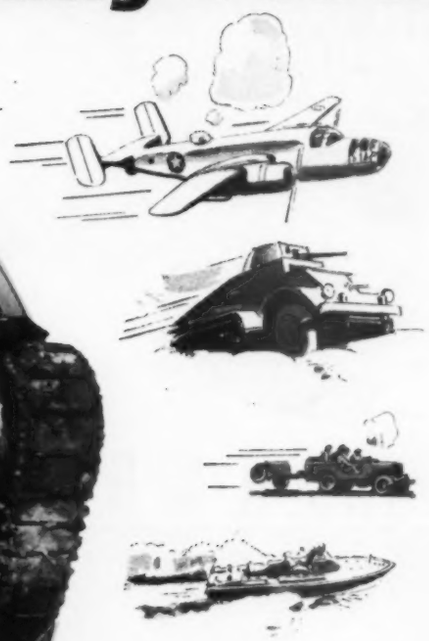
Uses Radio to Fight Absenteeism

Workers who realize the importance of their jobs, who recognize how indispensable a role they are playing in the war-winning effort, are more inclined to be on the job, to do their utmost.

More effectively to put this story across to their workers, a group of Rockford, Ill., manufacturers has bought radio time. Three times a week "Soldiers of Industry," a 30-min. program, dramatizes the production of certain items made by these companies, and shows how they are used by our fighting men. In addition to this dramatization there is flash news about the personnel in the companies—results of bowling and other sports, "personal" items, and the reading of letters from former employees now in service.

Cost of the program is prorated to each factory according to its size, and records

Translating MOTIVE POWER into Fighting Power



● Tanks, torpedo boats, aircraft, scout cars, half-track vehicles, and countless mobile units on the battle fronts and supply lines of the armed forces of the United Nations depend upon the Bunting Bearings with which Universal Joints, Propeller Shafts, Transmissions, Clutches, Power Take Offs, Axles, Torque Converters and other mechanisms are equipped.

Bunting Bronze Synchronizing Rings, which are a vital part of certain Tank Transmissions, provide the ready maneuverability so necessary in these outstanding combat units. Many and various Bunting Bronze Bearings, Bushings and Bronze parts give smooth, dependable performance to the other control and power mechanisms.

Manufacturers of these great weapons find Bunting products able to meet exacting specifications. If you have a bearing problem in any field of application, Bunting experience and resources can help you. The Bunting Brass & Bronze Company Toledo, Ohio. Warehouses in All Principal Cities.

Bunting

BRONZE BUSHINGS • BEARINGS • PRECISION BRONZE BARS

"Safe-Hed"
STEEL STAMPS
FOR EVERY INDUSTRIAL NEED

AVAILABLE FROM STOCK

Recommended for 90% of all Industrial stamping needs . . . Matthews "Safe-Hed"* Steel Stamps are safe and the most economical for your stamping application. *Reg. U.S. Pat. Off.

WRITE FOR CAT. 146-A

An invaluable booklet for steel stamp buyers. Write for your copy today!

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STANDARD GRINDERS
for faster production and economy

DOUBLE END WET GRINDER

The use of water on grinding wheels removes dust at its source, lessens tool and sharpening damage, and gives finer finishes.

Grinder and pump motors operate simultaneously. Sizes 2, 3, and 5 HP for 12" to 24" wheels.

Write for new catalog 43, prices

STANDARD DRY GRINDER

This specially designed Grinder has a totally enclosed 1750 R.P.M. motor. Push button safety starter, tool tray, water, pot, wheel guards (adjustable) with hinge door, exhaust outlet, adjustable spark breaker and tool rest.

The STANDARD ELECTRICAL TOOL Co.
CINCINNATI • OHIO
2492 River Road

AUTHENTIC • RELIABLE
For Plant and Office

CINCINNATI
Time Recorders

Dignified, simplified method of time and job recording for plant and office use. Designed and built by pioneers in the development of Time Recording Machinery for almost half a century.

Built and Guaranteed by
THE CINCINNATI TIME RECORDER CO.
Cincinnati, Ohio
Branch Offices in Principal Cities

are obtainable for play-back to the various plants during the week.

Participating companies include American Cabinet Hardware Corporation, Cotta Transmission Corporation, George D. Roper Corporation, Greenlee Brothers & Company, Ingersoll Milling Machine Company, Mattison Machine Works, Mechanics Universal Joint Company, National Lock Company, Rockford Drilling Machine Company, Rockford Machine Tool Company, Sundstrand Machine Tool Company, Woodward Governor Company.

•

Recognition for Women in War Plants

Women on the industrial front are doing as important a part in helping to win the war as the women who have joined the armed services, and should

therefore receive the same kind of recognition, believes Harry Woodhead, president, Consolidated Aircraft Corporation. He called on all industry engaged in war production to give this recognition to its women workers, and suggested that they be called the WICS—the Women's Industrial Corps—and be allowed to wear the emblem shown here.

•

National Health Crusade Planned for Manpower

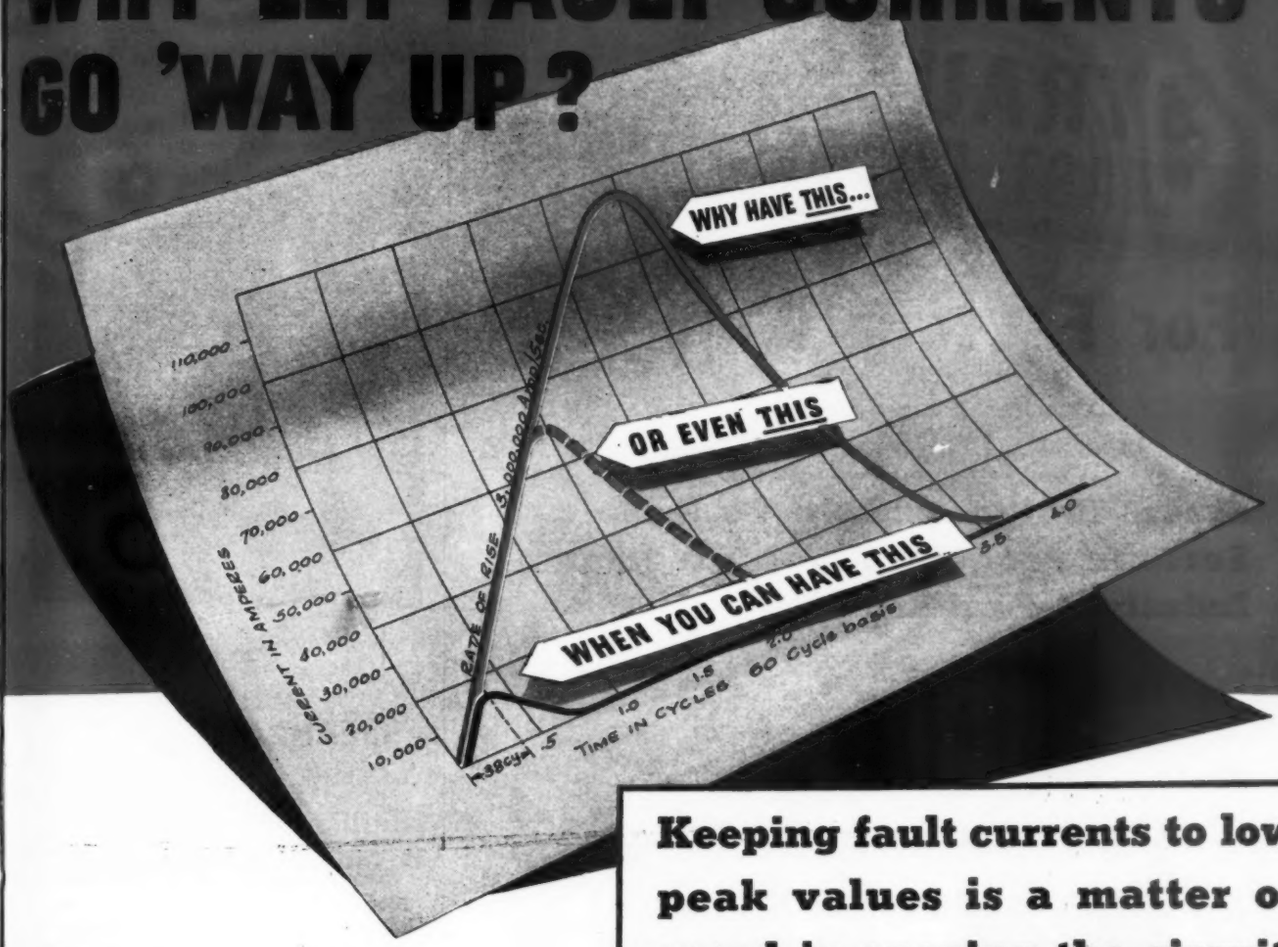
A nationwide health crusade for more effective war and civilian manpower has been planned by the Chamber of Commerce of the United States. A National Health Advisory Council of 33 leading authorities on health, hygiene, safety, and nutrition, headed by Dr. James L. McLester, of the University of Alabama, will carry out the program.

Chairman McLester outlined the council's plans as calling for abroad health education program available to industries and communities through local chambers of commerce and other local members of the National Chamber. Objectives recommended were: (1) Strengthening and supporting local community health services and assisting local hospitals; (2) assisting smaller industries to develop more adequate health and safety service, cope with absenteeism; (3) attending to health

SAVE MATERIALS AND MACHINES

On d-c motor drives and M-G sets connected in parallel...

WHY LET FAULT CURRENTS GO 'WAY UP?



Keeping fault currents to low peak values is a matter of speed in opening the circuit.

WHEN A FAULT OCCURS on a d-c circuit in which generators, converters or rectifiers are connected in parallel to feed large motor drives, the rate of current rise is extremely rapid. Rates of the order of several million amperes per second are not uncommon.

With such rates of rise, conventional circuit breakers designed to open in 3 cycles, or even in 1½ cycles, must be built to withstand the effects of the high currents encountered. Bus structures must be of ample conducting material and must be heavily braced.

SAVE MATERIALS

But rapidly rising currents can be interrupted much more quickly. The current can be limited in a period of the order of .038 cycle. Under such quick-opening conditions, materials in the system can be much lighter; bracing of buses much simpler.

SAVE MACHINES

Slow opening gives time for a flash-over to damage brushes and brush-holders. Fast opening saves them; saves manpower and time used in repairs or replacements and, in these times, saves machines for productive service when replacement parts are not available.

HIGH-SPEED CIRCUIT BREAKERS HAVE PROVED THEIR VALUE

I-T-E has high-speed circuit breakers in service. They are new but their record is well-founded. Our engineers will gladly tell you about them.

I-T-E

AIR SWITCHGEAR

IMMERSED IN AIR • ENCASED IN STEEL

Representatives in Principal Cities

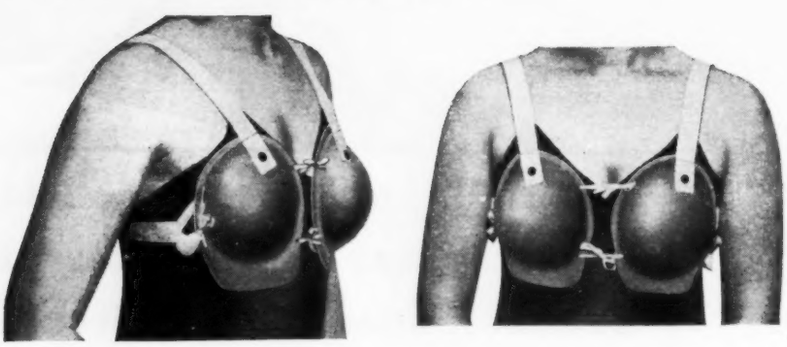
CIRCUIT BREAKER CO., PHILADELPHIA, PA.

They're NEW . . .

STRAUSS BREAST PROTECTORS

For Factory Women

Breast Protectors Help To Solve a Serious Problem Among Women Industrial Workers.



Designed to protect the women who have taken over industrial jobs, the STRAUSS Breast Protectors are of flesh-colored, molded fiber with a flat base to resist shock. The harness, which is adjustable at front and sides, can be removed completely from the cups and laundered.

The STRAUSS Breast Protectors are available in small, medium, and large sizes.

The STRAUSS Company also manufactures a light weight, comfortable Head Protector Helmet for women, as illustrated.

Write for Bulletin 143 which gives complete information about STRAUSS Head and Body Protection.

Style 205

The **STRAUSS** Company

875 Ewart Bldg., Liberty Ave., Pittsburgh, Pa.

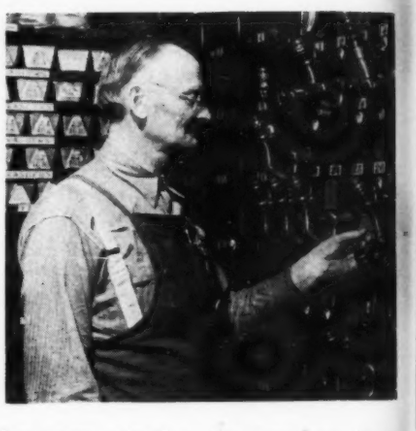
SAFETY HATS and CAPS • SAFETY BELTS and HARNESS

aspects of women in industry, and care of children of working women; and (4) cooperating with other agencies to improve national health by stressing nutrition, particularly in war industries.

•

He's Always on the Job

One of the answers to America's manpower problem is found in Charles P. Decker, who works in the tool distribution department at Douglas Aircraft. He



has never missed a day, nor even been late, since he first started to work for this company—and he is one of its oldest employees.

•

Nutrition Programs Bolster War Workers

Plants following Office of Defense Health and Welfare Services' recommendations for better nutrition have found their accident rate cut as much as 30 percent and a decrease of almost 20 percent in absences, according to reports coming in after five months of the ODHWS' National Nutrition Program.

A special "Victory Lunch," five minutes off for that all-important pint of milk, "snack" wagons, plant cafeterias and food wagons stocked with well-balanced, hot meals, and nutrition courses for war workers' wives are a few of the ideas that have made the plan work.

Basing the program on recommendations of doctors and nutritionists who made a nation-wide survey of industrial centers, ODHWS set up a regional organization to get a nutrition program to workers and plant managers. Thousands of volunteers, recruited to serve on nutrition committees in communities in 2700 counties over the nation, explained to war workers and homemakers the need for correct diet.

The "Victory Lunch"—a nutritive meal of citrus fruit or tomato juice, meat or alternate, raw vegetable salad, green or yellow vegetable, potato, and milk in some form—cut absences 19 percent in the first four months for an Evansville, Ind., plant. Curtiss-Wright, following the ODHWS program, provides food service for employees in all its plants. Milk dis-

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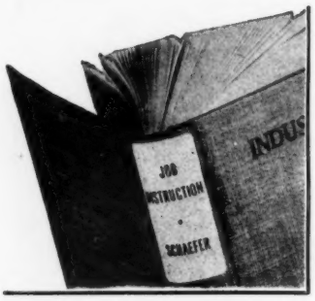

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In Charge of Supervisory Training,
The Pennsylvania State College

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A manual for all those who are charged with the responsibility of training others on the job. It presents the basic principles of job instruction in the terms and language of industry, with emphasis on the practical application in industrial situations. Specific case problems and questions—taken from actual experiences in industry—carry the reader back to the practical problems in his own plant.

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tributed daily to 1500 employees during a 5-minute recess has cut accidents for a Trenton, N. J., war plant 30 percent and brought about a general improvement in employees' health.

Another Nutrition Advocate

Hundreds of workers in vital war plants depend upon the single-track diet of their lunch pails to carry them through the working day, and, according to Thomas Parran, M.D., Surgeon General, U. S. Public Health Service, many suffer from malnutrition or "hidden hunger."

Pointing out that many industrial workers are obliged to live where housing is inadequate, restaurants are poor, and medical facilities scarce, he urges industry to supply canteen or cafeteria service so that workers may eat properly. Only with the right food and enough of it can war workers carry on, therefore he advises that some plants might do well to provide not only a hot midday meal but all three meals. "Snacks" in the plant are an excellent idea, too.

Nutrition Policy

Proposing a permanent Nutrition Council in the State Health Department to coordinate nutrition policies, Senator Thomas C. Desmond, Chairman of the New York State Joint Legislative Committee on Nutrition, stressed the need for an organized food planning program to meet wartime problems of rationing and of providing improved diets for war workers.

Recommendations, in part, were that canteens should be required in war plants, and that such food should not be rationed; that war plants be encouraged to serve between-meal snacks of nutritious foods with brewer's yeast added; that the state should relate its nutrition and food production policies; that the state's nutrition policy should now be directed chiefly toward improving the diet of war workers.

•

Training Plan Makes "Veterans" Quickly

One of the many ways of making experienced workers out of new ones—and thereby speeding production and eliminating waste—is an in-plant training program. Among the companies that have found this method effective is Manufacturers Screw Products, Chicago.

Sessions are open to everyone who is interested—office, factory, and warehouse employees. Although attendance is voluntary, more than 75 percent of the total workers are attending regularly, on their own time.

Two-hour classes are held once a week. Each session is devoted to a special phase, and each new subject is introduced by a guest speaker who specializes in that field, supplemented by movies, when they are available, and by tours through the plant.

Written tests of the "quiz" type are conducted, and the participants are carefully graded, not as a basis for promotion

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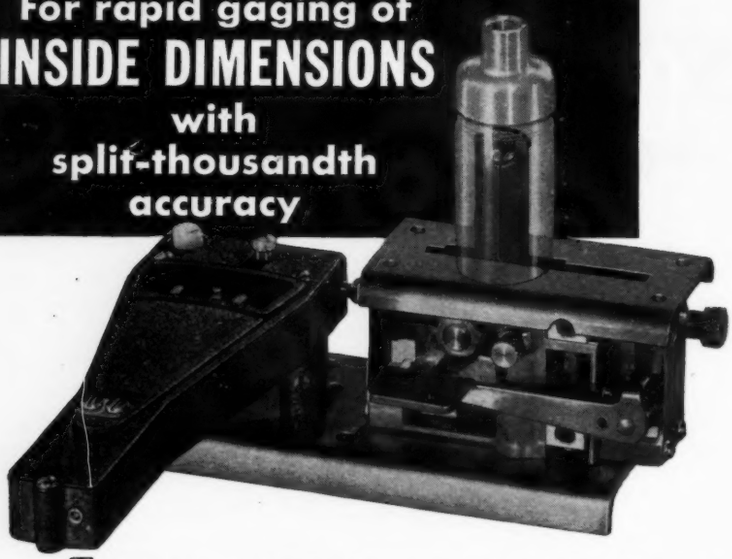

THE TRICO MICRO-CHEK is now in use in more than 2250 war plants to speed up nearly all types of precision gaging. Multiplies dimensions by 200 — reducing eyestrain and fatigue.

The new Caliper Type facilitates rapid gaging of internal dimensions, regardless of shape — from 3/16" to 2-1/2" — by means of expanding caliper fingers, adjustable against wear. Set up ready for use. Applicable to practically any recessed gaging need — replacing plug gages.

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F-1

or penalty, but to show each man how much he has absorbed and to correct any erroneous impression.

Under this method new employees become "veterans of the industry" within a few weeks, with a working knowledge that might otherwise require months, according to officials of this company, who also state that they will be glad to send the details of the way they organized their school to any manufacturer who may be interested.

•

Employee-Contributed Editorials Build Morale

A publication of, by, and for employees can be a real eye-opener to management. Zenith Radio Corporation, Chicago, finds it has some good morale-builders in employee-contributed editorials that come unsolicited for publication in the employee paper.

"YOU and the Victory Effort" by an anonymous employee asks each worker to take personal inventory. "Can you honestly answer the following questions?" is the query.

1. Do I watch my work closely so that no bad pieces or assemblies get by?
2. Do I waste time? Do I think of funny stories or something that happened that I must tell my fellow employees immediately?
3. Am I a time thief? Do I take off extra moments to sneak an occasional smoke, or do I watch my boss, at about rest period time and lunch time, so that I can sneak out of my department and to the cafeteria ahead of my associates?
4. Am I an habitual absentee? Am I habitually tardy, or lax in putting in my appearance to be assigned to a job? If I am, I am the worst conceivable offender to the cause.

The editorial concludes: "Let us make our slogan 'Unity and Consistency until our battle is won' as a department, and 'Do it right the first time' as each one's personal slogan."

And Zenith's boys in the Services know their former co-workers are behind them. A special overseas edition on thin paper follows those in foreign territories, and the regular issue goes along to the other boys.

•

A Look at the Cost of Living

The average factory worker has improved his living standard—his purchasing power in goods and services—41.4 percent in more than three years of war despite the steady rise in living costs, according to a survey made by the National Association of Manufacturers.

The survey states that in August, 1939, the month before the European war broke out, average hourly earnings in manufacturing were 63 cents. Average hourly wages began to rise early in 1940, and by December, 1940, the average hourly wage was 68 cents. Still further rises brought average hourly earnings in manufacturing to 90 cents by November, 1942.

Average weekly earnings in manufac-

BELTING AND HOSE WITH "THE THUMB"

Aristotle said: "The superiority of man over animals lies in the hand; the superiority over men, in the thumb."

For the movement of materials and transmission of power by belts and hose and the control of power by industrial brake lining, Thermoid Products have that extra something that is symbolized by the thumb.

Thermoid builds these products with an approach that is unusual. Thermoid engineers and production technicians have a realistic viewpoint. They visualize these products in use in the field rather than as just so much footage or poundage going through a plant. No wonder Thermoid Industrial Rubber Products have an outstanding performance record—they are born with the extra serviceability symbolized by the thumb.

When the order carries the name "Thermoid", every executive from the top to the bottom knows that the Purchasing Department is giving Production the best that can be had.

P.S. In line with material conservation, Thermoid has prepared a series of bulletins on how to extend the life of rubber products now in use. You might find them helpful as reminders to your operating people. Feel free to ask for copies.

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products.

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53 Lexington Ave., Brooklyn, N.Y.

turing from August, 1939, to August, 1942, increased from $24.52 to $39.54, due in part to the longer work week and overtime payments, as well as to increases in basic wage rates.

The increase in factory earnings and in hours is best illustrated by the percentage rise since August, 1939. From August, 1939, to November, 1942, the average hours worked per week have increased 15.8 percent. Average hourly earnings have increased 41.8 percent, and the average weekly earnings have increased 71.8 percent. From August, 1939, to May, 1942, according to the Bureau of Labor Statistics, the cost of living has increased only 17.6 percent.

•

Pay Now, Take Delivery After the War

Welders will be able to start businesses of their own when peace comes, if they participate in a plan being set up by Lincoln Electric Company, Cleveland.

By making regular deposits in the Hayden office of the Cleveland Trust Company, earmarked for welding equipment, depositors will be the first in line to get this equipment when priorities are ended.

In a four-page folder the entire plan is outlined, and its advantages are stressed. A coupon is included ready to be filled and mailed with the first deposit.

•

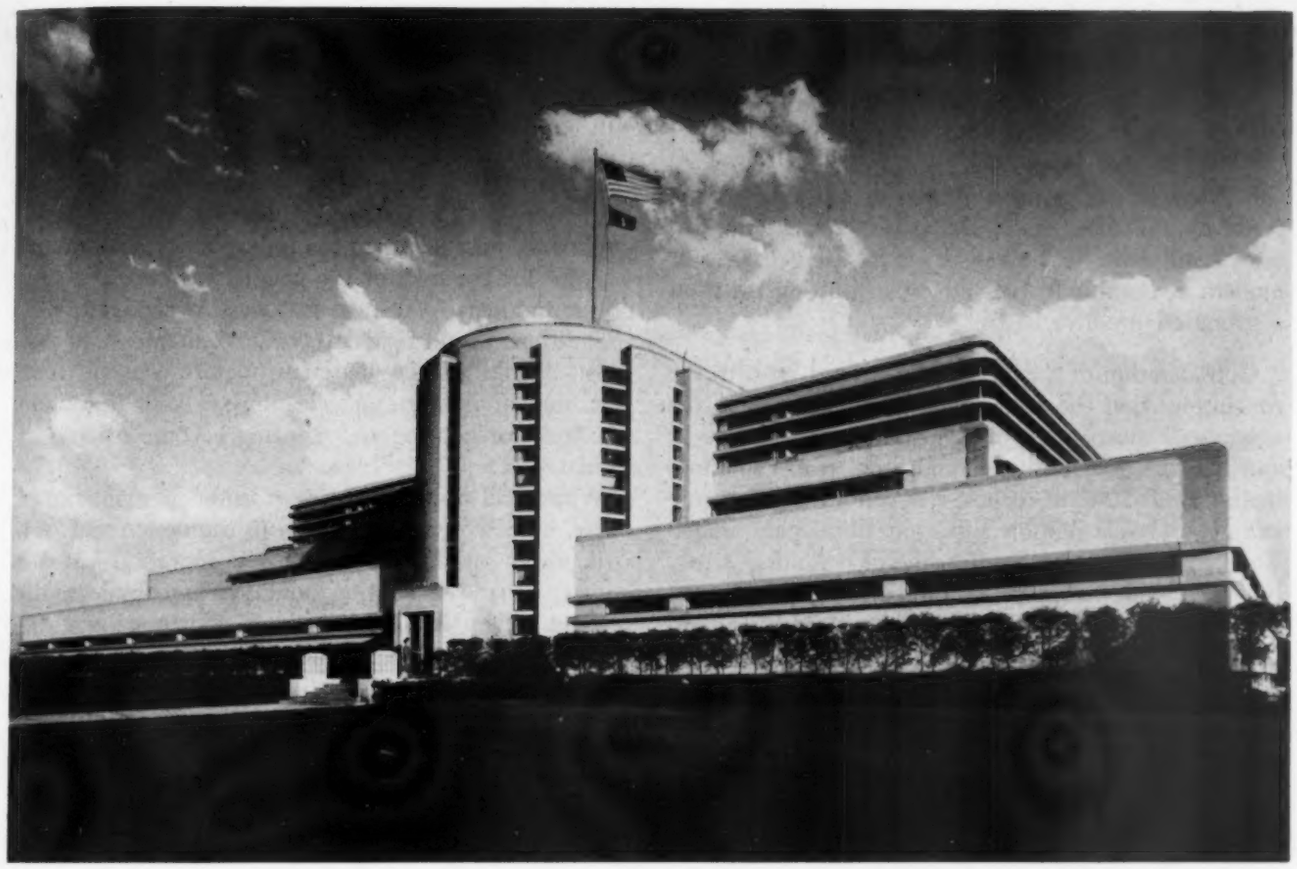
Industrial Truck Bookings As Shown for January

Domestic bookings of electric industrial trucks and tractors during the month of January, 1943, totaled 323 units, according to figures released by the Industrial Truck Statistical Association. The net value of chasses only booked during January totaled $1,639,547.02.

January bookings included 4 non-elevating platform trucks with capacities and chasses base prices ranging from 4000 to 6000 pounds and $1930 to $2005, respectively, and a total net value of $7945; 184 cantilever trucks with capacities and chasses base prices ranging from 2000 to 20,000 pounds and $1375 to $8950, and a total net value of $697,616.12; 15 light and heavy-duty tractors with chasses base prices ranging from $1650 to $1755 had a total net chasses value of $25,940.90; 120 crane trucks with capacities and chasses base prices ranging from 300 at 7 feet to 10,000 pounds at 5½ feet, and $5480 to $8150, had a total net value of $908,045.

All net values are at factories after additions and deductions for variations from standard specifications, trade-in allowances, when applicable.

No adjustment has been made for cancellation of the following 1943 bookings: 4 platform trucks, value $8520; 15 fork trucks, value $66,145; and 6 crane trucks, value $46,230.



Handsome new plant of G. D. Searle & Company at Skokie, Ill., stands on a 5-acre landscaped tract

INDUSTRIAL BUILDING for Today and Tomorrow

Meeting with dispatch all demands made upon it, the construction industry added 3½ billion dollars' worth of buildings to the nation's industrial plant during 1942. Some 2½ billions' worth more will be erected in 1943, consisting largely of government financed projects, but including an appreciable amount of privately financed building and maintenance.

From the record of the construction industry during the past year, industry at large should derive much satisfaction. The speed with which problems of great magnitude were solved proves the existence of leaders with imagination and operators with flexibility, which augurs well for quick adjustment after the war.

Will an extraordinarily alert construction industry be needed? The evidence points that way. It indicates, also, that the war plants which have been erected to date, and all industrial plant buildings of the near future, will be of peculiar importance because of their effect upon production after the war. There are several reasons why this is so:

1. This nation is going to be engaged extensively in world trade – and therefore world competition – from the moment the war is finished.

2. It will have fewer and lower tariff walls.

3. It will have a much larger working force than it had before Pearl Harbor – some 55,000,000 people, most of whom will be wanting jobs.

4. The working force will have a make-up different from any we were accustomed to in peacetime; there will be many more women.

5. A much larger proportion of the working force than before the war now knows what a good work place is like.

6. Wider geographical distribution of industry, be-

cause of the war, will give workers more latitude in choosing the place where they want to live.

7. Enough new plants and additions have been erected to render obsolete an unusually high percentage of the older pre-war buildings.

8. Many of the plant buildings of our future competitors – the countries of the world, friends and enemies – will have to be rebuilt, and will be made as modern as possible in the interest of putting them on a strong competitive basis.

Consideration of the eight reasons cited leads to the conclusions that the right course must be taken in the design and construction of plant buildings at this time; and that the relationship of industrial plant buildings in the United States to post-war conditions of manufacture and distribution must be thoroughly understood. As justification for this line of reasoning it may be worth while to speculate about what is ahead.

With so many extremely large new plants in existence, it is difficult to dismiss the thought that economy in manufacture may dictate using them instead of many small plants to make even widely different products. The advantages would lie in lower costs for plant services, building upkeep, and shipping facilities.

With new population centers brought into existence during the war, and because of social considerations, industry may find it necessary to take its jobs where it can find workers.

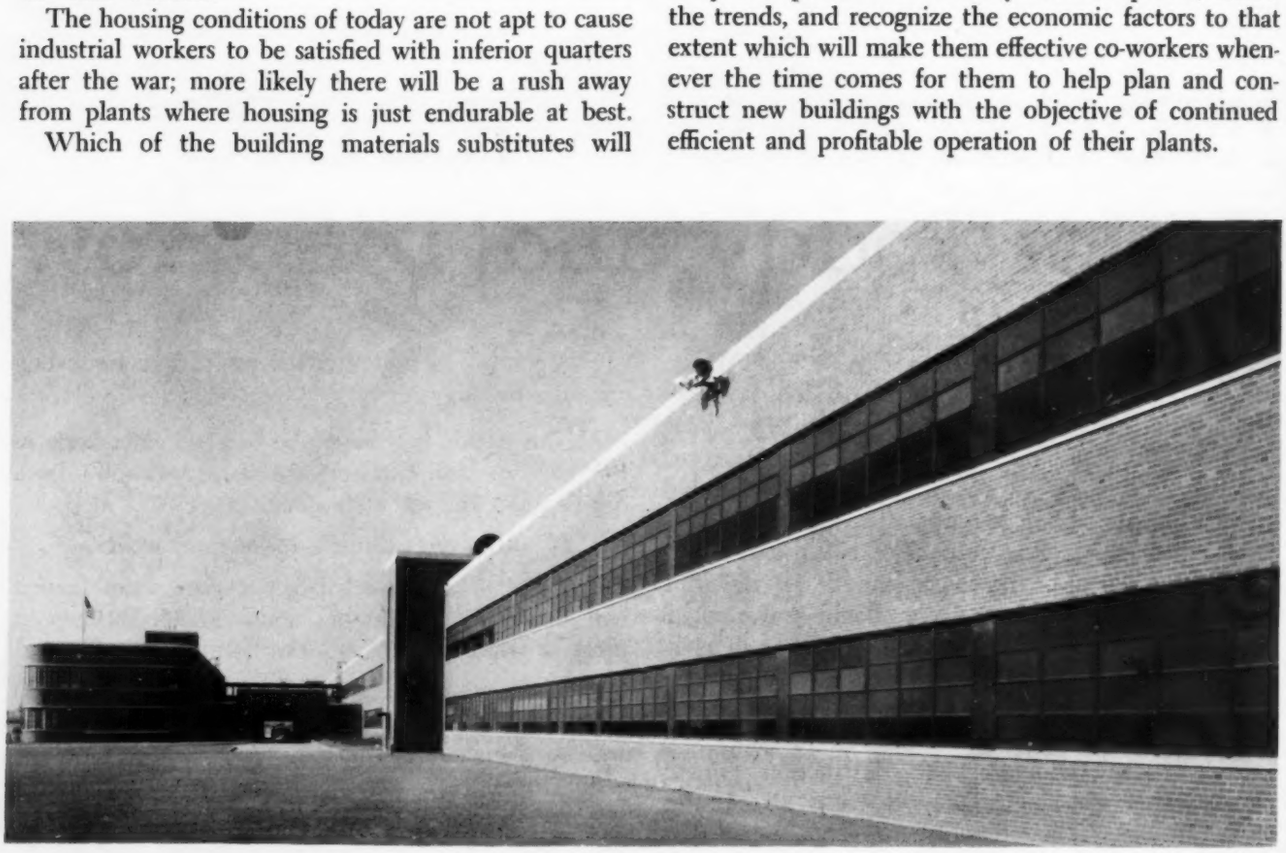
The housing conditions of today are not apt to cause industrial workers to be satisfied with inferior quarters after the war; more likely there will be a rush away from plants where housing is just endurable at best.

Which of the building materials substitutes will endure, and how will they affect building cost and obsolescence? Consider: Wood structural members. Concrete single-story walls. Plastic pipe. Wood pipe. Wood sash. Non-metallic lighting fixtures.

There are new standards for worker health, nutrition, and safety. Will they make old buildings obsolete? Will they still further affect the design of new buildings? Will most plants of the future be air conditioned – if not for the sake of the people, then for the sake of the product? Will new materials in products, new applications of old materials, new requirements in precision because of new materials, require constant temperatures, humidities, and cleanliness? Will minimum standards for lighting and painting become matters of legislation?

What shall be the building maintenance policies of today, in view of what is ahead in the design and construction of buildings and economic conditions? If it is apparent that the existing buildings are obsolete, the obvious policy is to make them do throughout the war if possible and long enough after that to permit analysis of the effect of changed conditions upon the particular plant involved. If existing buildings are new, they should be kept in prime condition at all times.

From the questions raised and the suggestions made here, the conclusion seems inescapable that the men of industry who are charged with the responsibility for plant operation must study the new plants, follow the trends, and recognize the economic factors to that extent which will make them effective co-workers whenever the time comes for them to help plan and construct new buildings with the objective of continued efficient and profitable operation of their plants.



Ford Bomber Plant at Willow Run, Mich., was one of the last plants built before the restrictions on materials became so stringent. This view shows administration building, garage, engineering section

Today's Trends in Design—I

By H. K. FERGUSON

President, The H. K. Ferguson Company, Cleveland

ANY INNOVATION in industrial plant buildings will survive only if it can pass three fundamental tests: (1) It must be produced more economically; (2) it must provide greater usefulness; (3) it must look better.

It is not easy to predict any single new feature that will respond favorably in all these tests. The construction industry is in a state of transition, and sound predictions of today may never materialize; the fantastic guess may soon come true.

We have little reason to expect too many departures from design practices developed in the past year. Foundations probably will continue to have more concrete and less steel. Reinforced concrete multi-story buildings will be used only where processing equipment requires such housing. Structural steel, although more plentiful now than formerly, will still be confined principally to heavy, long-span jobs where processing makes wood undesirable or where long-span reinforced concrete designs are inadequate. Hardware will remain practical and unembellished, and the use of copper and other critical metals will be at a minimum.

Toward Simplicity

The tendency in exterior designs is toward simplicity. Modern streamlining is still in evidence, and there is a trend toward providing larger rectangular units of floor space with ample headroom rather than a number of smaller units with varying heights. Materials and construction practices on exteriors are standardizing themselves Corrugated asbestos is often used for outside walls, although brick is frequently convenient as well as quick to erect. Ornamental exterior trim is dispensed with, except for an occasional lintel, belt, or coping course. Doors are most often wood instead of metal, and there are various types of wood sash, with or without metal fittings, that may be used in place of steel sash.

Exterior painting is ordinarily confined to weatherproofing on woodwork. Landscaping is kept to a minimum, but approach and patrol roads, as well as parking lots, are well built and maintained because of their importance at the present time. Fences are substantial and well guarded, although often built with wood posts and closely spaced barbed wire instead of the usual heavy mesh.

The use of green timber is teaching us to take into account additional measures that will either prevent shrinkage, checking, and warping, or provide for correction at a later date by including in the design the proper bracing and connections.

More Standardization

We are continuing to devise improved methods for standardizing the fabrication of wood trusses which can be shop-dimensioned for assembly anywhere. In some instances, members are numbered and erected as if they were actually structural steel. Surprisingly long spans are now supported by timber trusses assembled mainly by built-up members with proper bolts and connections, and some medium-span lightweight trusses are cased with plywood webs for added strength. Crane runways are made of heavy timbers, and the appearance of such jobs is improved and will continue to improve, especially if paints are soon made available.

We can reasonably expect more roofs of gypsum plank, corrugated asbestos, or other non-combustible materials, because of the shortages of wood which usually would be used for sheathing. Floors are being made of concrete, often at sufficiently low levels to provide for the addition of wood block or other finishing materials at a later date.

Substitutions in basic design are also being made in the various auxiliary features of our plants. The market for boilers and electric generating equipment likely will continue to be tight because of duplicate uses in the maritime and other programs. Power houses are being designed to make use of second-hand equipment wherever and whenever it is available. Boilers 20 to 25 years old will be reconditioned and re-used. Second-hand switchboards will also be rebuilt and rearranged, and new instruments of all kinds will be held to an absolute minimum. A trend is to eliminate them for the present, and allow provisions in the plans for installation at a subsequent date.

There is even now a trend to convert old plants to war work rather than to build new ones, and with a year or so of operating experience behind them, many manufacturers will have sufficient information available for rearrangement in layouts and facilities to give them more and cheaper production. The goal is to eliminate production bottlenecks as quickly and as economically as possible.

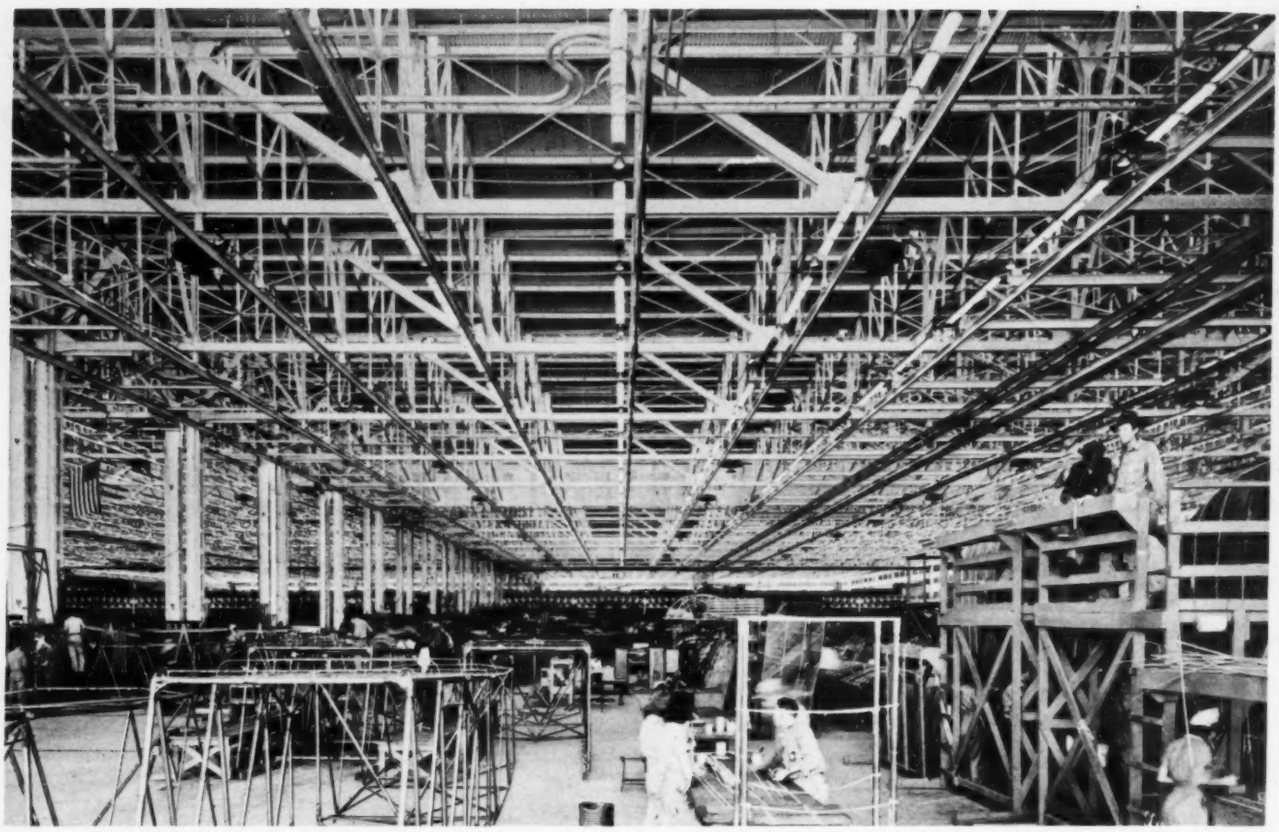
The material question is difficult to comprehend. The anticipated decrease in volume of work undoubtedly will produce increased quantities of certain materials, among them steel. Design still must be predicated fundamentally on materials and service equipment that are immediately or quickly available. Otherwise, delays will be encountered in changing drawings or waiting for slow deliveries, while the material market now is such that proper drawings made promptly and requiring a minimum of changes during construction, can greatly expedite completion.

Manpower Problem

The time may come when materials are actually subordinated to manpower available. In this event we shall build primarily with materials that require the services of a minimum number of personnel.

There are two reasons for regarding this as a possible trend: First, the size of our army is requiring the services of most of our able-bodied men, and the fact that most of our building programs are now completed reduces the essentiality of the construction industry in granting deferments; second, projects will be smaller and smaller and will require a greater number of men per unit of construction than the larger jobs.

It is still too soon to say where designing trends will go from here. But a good guess is that ultimately the best in recent modern factory design will be retained with further simplification and better uses of materials developed by the war.



One of the wide assembly bays. Fluorescent units and high-intensity mercury-vapor lamps insure a minimum of 30 foot-candles. Light is reflected from white cement floor to underside of assemblies

BOEING

Engineers and builders: The Austin Company, Cleveland

ONE OF THE NOTABLE industrial building projects of 1942 is Boeing Aircraft Company's parts manufacturing and assembly plant at Wichita, Kan.

The plant is of steel-frame construction, with welded roof deck and concrete floors. Sidewalls are of brick below the first band of sash, with continous bands of corrugated asbestos siding and sash in alternate arrangement above. Included under one roof are the following:

Basic primary shops for cutting, stamping, and forming sheet metal.

Machine shops for production of precision parts from bar stock, forgings, castings, tubing, and metal in other solid or extruded forms.

Subassembly departments, most of them in mezzanines.

Final assembly areas, said to be the widest and highest unobstructed areas in the Middle West.

Heat-treating, plating, anodizing, and parts-painting operations, also a foundry, all requiring special ventilating controls and located in isolated rooms adjoining distribution aisles that surround production and assembly areas.

Inspection, testing, and X-ray laboratories, also photo-templet department and photographic laboratories, all air conditioned.

Cafeteria and kitchen providing food for cafeteria and rolling food wagons which deliver hot meals to all parts of the plant for tray service three times a day.

Underground service tunnels for employees, leading direct from the entrance gates to stairs within 200 feet of all working locations in the main production area. Time clocks are located in the tunnels, which are equipped with benches for use by employees while waiting for shift changes or during lunch periods. Basement lavatories, toilets, and cloakrooms adjoin these tunnels.

Boiler rooms providing steam for heating and compressed air for manufacturing purposes.

Six separate monorail systems with nearly 8 miles of track expedite the handling of incoming materials, parts in process, hot metal, and finished dies. Bridge cranes up to 300 feet long travel the full length of the building and serve every square foot of the main assembly bays. The mezzanines over a large portion of the

Top, delivery end of plant, showing the wide-span hangar doors. View across roofs reveals sawtooth design which allows north light to bathe production areas; warehouse sections are lighted by monitors like the one in the foreground. Walkways from peak to peak are patrolled to protect plant and people

plant are devoted to subassembly work, and are served by monorails which deliver subassemblies direct to the assembly floor below.

Roof construction throughout the factory area gives workers the benefit of a maximum of relatively constant daylight since it is all reflected rather than direct light. There are bands of windows across the roof, at intervals of 50 feet, so that the entire plant area is bathed in a north light which is reflected to the underside of plane parts or assembly jigs by the white cement floor.

Hundreds of triangular roof trusses were required between the main trusses extended across the unobstructed assembly areas. These triangular trusses support the sawtooth window sash and the roof itself, which consists of a welded steel deck covered with ½-in. fiberboard insulation. The latter is covered in turn by alternate layers of tar or asphalt and waterproofing paper to produce a weather-tight roof.

Fluorescent lighting has been installed throughout most of the plant. In the lofty assembly areas where clearance has been maintained below the roof trusses for production purposes, 3-tube fixtures 16 feet long are alternated with 400-watt high-intensity mercury-vapor lamps in rows 21 feet apart and extending lengthwise of the building. This installation—twelve 40-watt tubes per fluorescent unit—provides 30 foot-candles of intensity on the working plane. White cement drier used on the floors affords an exceptional degree of light reflection on the underside of wings and fuselages.

Serviced From Cranes

Lighting fixtures in the assembly area and mezzanines are serviced direct from the cranes operating over those areas. These cranes have been equipped with special service facilities so that fixtures can be reached without difficulty and lamps or fixtures readily replaced.

Fluorescent tubes are the exclusive light source used in the machine shops located under the mezzanines, and in most of the special-purpose areas, plant offices, inspection departments, and stockrooms.

In production areas the use of a 3-phase, 4-wire system of the high-power-factor type, connected at 240 volts instead of in a standard 120/240-volt, single-phase system, made it possible to reduce by 25 percent the amount of copper that would normally have been required for an area of comparable size.

Heat is supplied by a number of 350-hp. gas-fired boilers. Steam pipes rising alongside the building columns from underground trenches to points high above the floor, are connected to unit heaters of the projection type which draw air over the fins on cir-

Sawtooth roof admits generous amount of north light to mezzanines. Daylighting is supplemented by two-tube fluorescents

Tunnel system, left, handles worker traffic to and from job. Special ventilating equipment supplies plenty of fresh air

cular heating coils and then blow it down to the working area. Each heater is automatically controlled. Units are spaced 60 feet apart and thus cover every part of the assembly floor without any drafts or abrupt blasts of hot air.

Under the mezzanines, fresh air is brought in from the outside through ducts which provide circulation in summer and deliver heated air in cold weather. Naturally the building would cool off rapidly if the big 200- and 300-ft. hangar doors extending across one end were left open for any length of time. A special floor trench extending across the wide bays served by these doors has therefore been equipped with steam lines and fans to throw up a curtain of heated air whenever the doors are opened in cold weather.

Special ventilating provisions have been made to meet the requirements of health, comfort, and manufacturing processes. Heat and fumes produced in heat-treating, plating, and painting operations are exhausted direct to the outside through close-fitting hoods. Other fans bring in fresh air. In the foundry, exhaust stacks line two sides of the room, one line to remove heat and fumes from the gas-fired melting pots, the other to remove from the air any tiny metal particles caused by grinding the dies when they are cleaned and prepared for use.

Biggest ventilation job is in one large paint shop. The ventilating equipment covers two sides of the room, with 150-ft.-wide fresh-air intakes on one wall and an exhaust system of equal size on the other. Water sprays wash all paint from the air before it reaches outside atmosphere. The paint shop is equipped with explosion-proof lighting fixtures and sparkproof concrete floor.

The tunnel system provided to handle worker traffic to and from job locations in the plant has a special heating and ventilating system which supplies fresh air. Fans draw the air off through transformer vaults and exhaust it via basement toilet rooms to the outside.

Thirteen separate air conditioning systems serve a three-story office and engineering building, cafeteria, per-

Three-tube fluorescents supply 30 foot-candles at machines under the mezzanine. Big duct circulates fresh air in summer, heated air in cold weather

Right, personnel building has acoustic ceiling, recessed fluorescents, asphalt tile floors

sonnel building, laboratories, and six first aid rooms.

An underfloor distribution system carries air, power, and water lines to all parts of the plant.

Separated from the main plant is a storage building for paints and other combustible materials.

The 3-story administration building is air conditioned. Walls are plastered. Acoustical ceilings have recessed fluorescent fixtures with diffusing lenses which produce 50 foot-candles of illumination. Flooring is of asphalt tile. The exterior of the building is red face brick with stone trim and panels of black structural glass between window areas to create the effect of continuous horizontal bands.

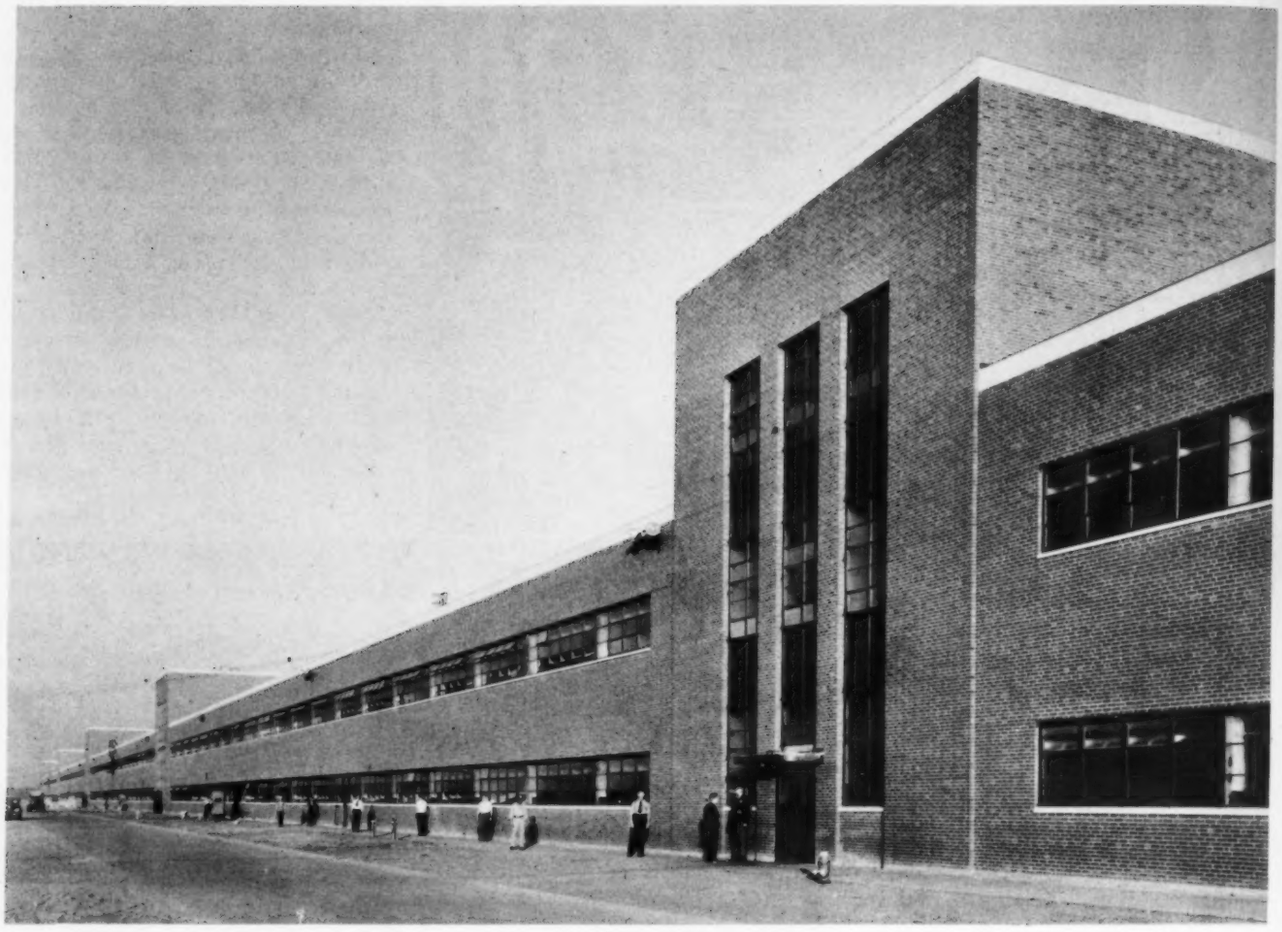
Lobby walls are faced with structural glass panels in steel gray with blue glass trim. Drinking fountains on the first and second floors are framed in circles of black structural glass. A double stairway is lighted by vertical fixtures with fluorescent tubes behind ribbed prismatic lenses.

The personnel building is a single-story, air conditioned structure with plastered walls, fluorescent lighting recessed in acoustic ceilings, and asphalt-tile flooring. Reception lobbies are equipped with bank-type counters for use in filling out applications. A number of small interviewing rooms are provided in both male and female employment departments. These departments are laid out as separate units, each having its own lobby and medical examination room. One wing of the building is devoted to training activities. Three conference rooms with folding doors can be used as one room to seat 300 people.

Plant protection headquarters adjoin the main employment gate. This structure houses the plant protection staff and contains special telephone and signal systems. Gate houses of brick and steel are located at the several entrances to the plant. Guard houses have been mounted on concrete columns at strategic points around the factory side. They have windows of heat-resisting glass to facilitate observation of all activities. More than a mile of walkways have been erected on the factory roof. They give a commanding view over every portion of the plant. Sentry booths are located along the walkways.

Further protection is supplied by the miles of fence surrounding the plant. The plant has its own fire-fighting equipment, and fire pumps with a capacity of 1500 gallons per minute are linked to a large gravity water-storage tank. There are thousands of sprinkler heads in the automatic sprinkler system which called for several miles of pipe.

Driveways and parking areas are paved. Two covered bridges for pedestrian use give direct access to six bus-loading platforms situated across the highway from the personnel building. The bridges are 350 feet long and 12 feet wide. Arches of modern wood-frame design support the sections over the road. Loading platforms are covered for the protection of employees in bad weather.



Towers relieve monotony of long north elevation; they house stairways, utilities, and fan rooms

FORD

Architect: Albert Kahn Associated Architects & Engineers, Inc., Detroit

SAID TO BE the largest factory known at the time it was built, the Ford Bomber Plant at Willow Run, Mich., is several times larger than originally planned, the ground floor area of the main building alone being 2,570,000 square feet, compared with an original layout that called for only 912,000 square feet.

It was one of the last war plants built before restrictions became so stringent, hence it affords a good contrast with some other plants constructed only a few months later. In this instance, the architects considered two construction schemes — one for a frame and roof of wood timbers, the other for a steel frame with metal-deck roof. It was found that the cost of steel-frame construction compared favorably with wood, and, since steel could be obtained at the time, the steel-frame design was chosen.

The main building is a semi-blind one, there being no daylight in the work areas. The sash in exterior elevations is so placed as to provide light and ventilation for factory offices and utilities which are located on first, mezzanine, and second floors. Production areas are of single-story construction, but are high to accommodate the many traveling cranes that handle huge parts such as wing sections.

The west and north elevations dominate, and to obtain relief for the vast lengths, the architects utilized towers spaced at intervals to house stairways, utilities, and fan rooms. A 2-story unit at the west end houses a testing laboratory, pay offices, hospital, maintenance and safety offices, kitchen, cafeteria, dining rooms, pay make-up vaults, government offices, and the ship engineering design department.

Final assembly lines occupy two 150-ft. clear-span bays that run the entire length of the building. The subassembly area includes four 60-ft. clear bays, and there are numerous other 60-ft. ones in the various manu-

Main building is a semi-blind one, there being no daylight in production areas, which are of single-story construction, but high to accommodate cranes that carry huge bomber parts. Ventilating system, low speed for winter, high speed for summer, is supplemented by 286 ventilator fans in the roof

facturing and assembly areas. Aisles are 20 feet wide, and are serviced by standard automobiles and trucks, as well as by cranes and conveyors.

The roof is 16-gage sheet steel, dipped in enamel and covered with vermiculite and four plies of asphalt-felt membrane, and surfaced with hot pitch and slag.

Floors are concrete slab, reinforced with two layers of wire mesh and covered with 2½-in. creosoted wood blocks.

Heating, ventilating, and air conditioning systems for the main structure and other buildings are of various types, selected to give the most satisfactory and economical results in each case. Steam for heating is supplied by four oil-fired boilers. Provision is made for converting these to coal. The steam line is designed to carry 200,000 pounds of steam at 50-lb. pressure. Steam is piped through a tunnel, about 5000 feet long, across the main building, with a branch running the entire length of the building, and to the several other buildings. All condensate flows into receiver units and is pumped back into a receiver in the power house about 75 feet above the first floor level. There are 16 pump rooms in the main building, two in the hangar, and one in each of the other principal buildings.

A hot-blast system is employed in the factory, and a combined hot-blast system and radiators are utilized in the engineering section. Because of the vast area and the layout of the main building, 65 fan rooms are required there, each handling 35,000 to 100,000 cubic feet per minute. All units have two-speed motors. Using the low speed in winter, the system supplies approximately two complete air changes per hour for the total height of the building. In summer the high speed is used, and the system is supplemented by 286 roof ventilator fans, each handling 10,000 cubic feet per minute, to provide about four air changes per hour for the entire height of the building, or ten changes at a height of 12 feet.

Heaters at All Doors

Mezzanines along the outside walls are heated by radiators and ventilated from the central systems. There are overhead heaters at all outside doors and along ends of the building where there are large glass exposures. In offices, operating rooms, laboratories, hospital wards, and elsewhere, radiators are wall-hung convectors with sloping grilles in the top; in toilet rooms, locker rooms, stair halls, they are wall-hung cast iron.

Heating and ventilating equipment has been designed for the future air cooling of all or any part of the area. About 14,000 tons of refrigeration would be required for the entire area.

Some air cooling has already been installed—notably in the precision gage and instrument rooms, and in the dope room. In areas where heat from underground tunnels and transformer rooms would be excessive, exhaust fan units have been installed to discharge the heated air up through the roof. Chilled drinking water is supplied to offices by two units and to 50,000 workers at a time by two others.

Power is brought to the plant by duplicate 120-kv. utility lines and is distributed underground at 13,800 volts, where all plant substations are located. There are no overhead bus or conduit systems in this plant, and the underground system is so designed that in case of damage only the relatively small area served by the damaged part would be cut off—and that very likely could quickly be connected up elsewhere.

Lighting is fluorescent throughout—approximately 156,000 lamps. In the general assembly area, lighting units are mounted end to end in continuous rows on 10-ft. centers, and at a height of 36 feet, to provide an intensity of 30 foot-candles or more at the working plane. In some sections of the plant, units are on alternate circuits; in others, every third fixture is connected to the switching circuit. As a result, flipping one switch will

turn on one-third, one-half, or all units in a row, as desired.

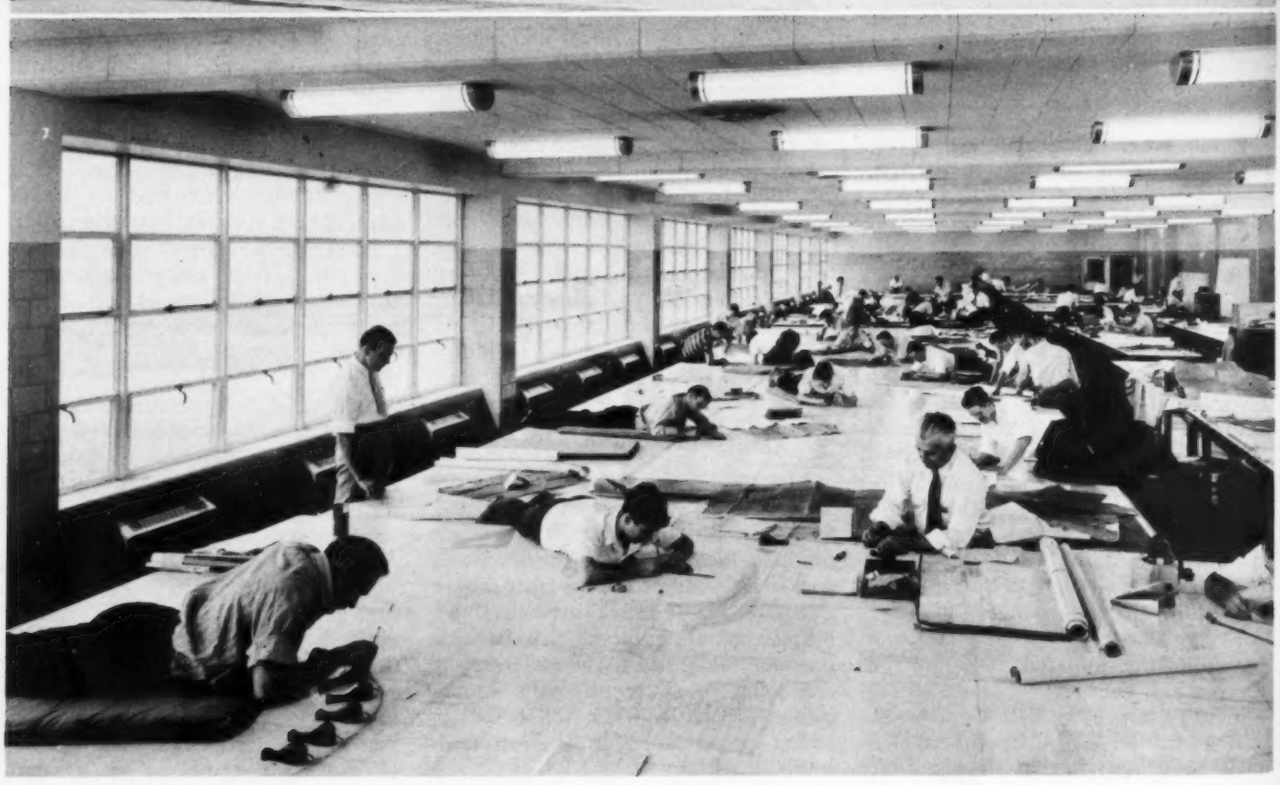
Plumbing equipment is functional rather than ornate. Since the north side of the property was held for future expansion, parking lots were located on the south side, across a railroad siding, and employees enter and leave via six overpasses at the mezzanine floor level. Toilets and locker rooms are located on these mezzanines. There is a toilet for each 38,000 square feet of floor area.

All corrosive and dangerous processed waste is handled separately by two sewers which go to neutralizing plants where the contents are rendered harmless and the gas is discharged into the air 40 feet above grade.

Drinking water is brought from Ypsilanti through a 12-in. main; water for all other purposes is brought in through a 24-in. main from two wells. This main feeds two 400,000-gal. tanks, one for plant use, the other for reserve and fire.

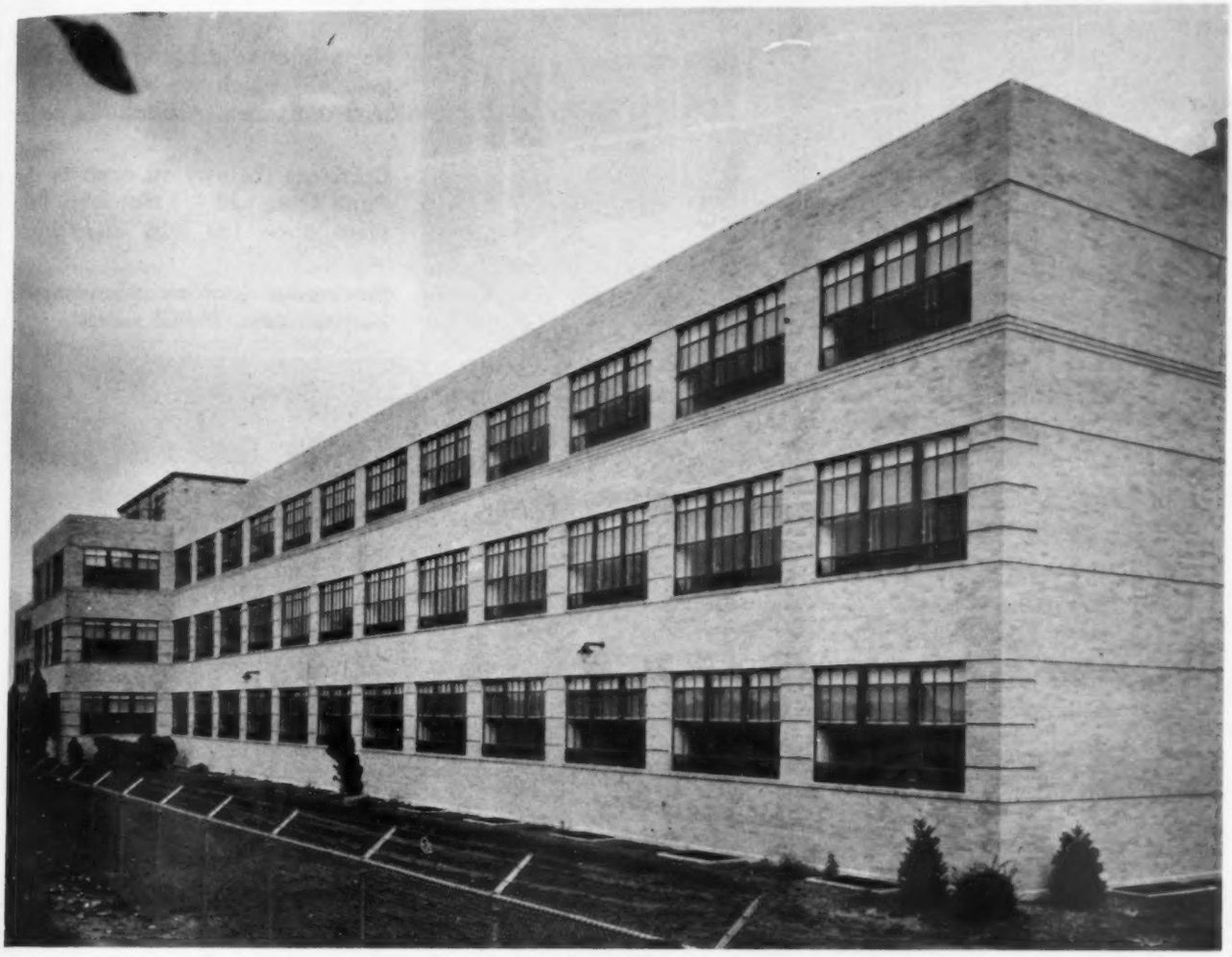
There is an extensive fire-protection system, including water mains with outside hydrants, an underground pump house with both motor-driven and engine-driven pumps, a fire department with engines and regulation equipment, sprinkler systems, and deluge systems in hazardous areas.

In addition to the main building, there is an administration building, training school, personnel building, a hangar with a total floor area of 270,000 square feet, and numerous miscellaneous buildings, such as garage, oil and gas storage, dope and paint, commissary, and power house.



Additional buildings include hangar (top) with its 270,000 square feet of floor. Daylighting in ship engineering department (lower photograph) is supplemented by special fluorescent lighting units

New Plants of 1942



Finished in buff face brick; planned for eventual expansion

RCA LABORATORIES

Architect, engineer, and builder: The H. K. Ferguson Co., Cleveland

SET DOWN in 260 acres of ground, in the quiet of the New Jersey countryside, the new RCA Laboratories at Princeton assembles under one roof kindred research activities hitherto performed by individuals widely separated by time and space. Thus it provides an atmosphere that is stimulating to scientific discovery and creative work, and gives to RCA's research the advantage of collective effort.

The present structure is T-shaped, and consists of a main building and a model shop. Eventually a Y-shaped building will be added, with the base of the Y centered at the top of the T.

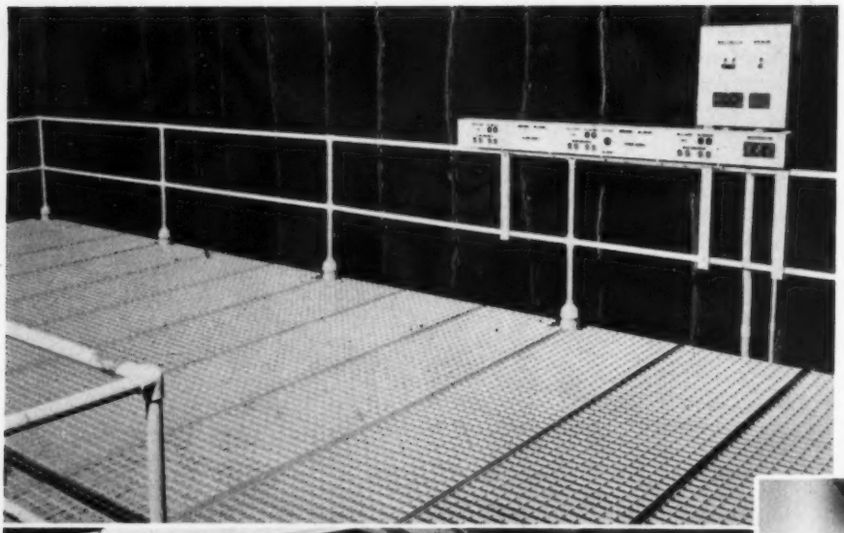
The main building is three stories high, of reinforced concrete and structural steel. The exterior is finished in buff face brick.

Casting No Shadows

Out of its 488-ft.-long corridors open 150 laboratories and workshops. Laboratories are spacious, with plenty of daylighting supplemented by indirect lighting which casts no shadows. A wiring trough extends along the top of each bench, supplies almost every phase and voltage of both alternating and direct current. Taps for water, gas, and air, as well as for hydrogen and oxygen where these two gases are used, are located in the bases. Also at each bench are convenient electric outlets for soldering irons and other electrically operated tools.

Walls of laboratory bays are built so that they can be easily altered, should it become necessary to change size of a room. Floors are comprised of a 3-in. section of porous cement with a 1-in. cement top, and asphalt-tile covering.

In the corner of each bay is a service duct or shaft with removable panels which afford easy access to add



Free field sound room (left) is 3 stories high. Steel-grated platform rests on rubber pads. Heavy curtains exclude noise

North light in drafting room (below, left) which has boards for fifteen draftsmen. Asphalt-tile floors

Corridors (below) on each of the three floors are 488 feet long. Into them open 150 labs and shops

Stockroom (bottom photograph) carries some 20,000 items

new services or make repairs. Telephone lines and signal systems also are in convenient conduits. Each bay has air circulation. Three of the laboratories are air conditioned.

Workshops are equipped with bench facilities and various machine tools for mechanical work. A mechanic is on duty to assist the research chemist who may want to make a specific part.

More complicated parts are made in the model shop, which is a single-story steel-frame structure with two rows of continuous monitors. Like the main building, it is finished in buff face brick. Lighting here is fluorescent. Floors are concrete with maple surface. Roof is gypsum plank. Window sash is of the factory type. The shop is equipped with lockers, wash fountains, and showers.

A pleasant cafeteria and modern kitchen are equipped to serve from 180 to 200 people at a time.

Today's Trends in Design—II

By SHELDON MARSTON

Associate, Albert Kahn Associated Architects & Engineers, Detroit

PRINCIPAL TRENDS in industrial design during the past year have been toward huge structures, omission of all non-essential features, and conservation of critical materials.

With the necessity for designing war plants for speedy construction, investigation of new methods of application and economy of design have been imperative. The necessity for economy and expeditious arrangement of services is more important under present conditions than ever before. The time consumed is relatively short, and often results in a design that can be completed more rapidly both in the preparation of plans and in field execution.

To Meet Shortages

It has been our own experience that in most instances the design of details followed standard procedure, but varied to meet conditions imposed by shortages of certain normally common materials. We have sometimes had to resort to old methods and processes and to use less desirable materials.

Airplane plants, for example, require large spans and wide column spacing. For reasons of economy, as well as to provide overhead crane handling facilities, such long-span construction normally has been designed in structural steel, but this practice now is seldom permitted.

A number of such projects were constructed by utilizing long-span wood trusses, with wood columns for low headroom requirements, and with pre-cast, or built-in-place, concrete columns where the requirements for headroom were greater. But the supply of structural timber became critical and necessitated changes in design.

New methods in the use of reinforced concrete were developed. This material had rarely been used for single-story structures because of its lack of adaptability to speedy construction. Under the emergency conditions, and by means of the cooperation of architects and contractors, production-line methods for pouring concrete were adapted to a design used many years ago. In a specific project, by means of this method which utilizes movable forms, the contractor was able to pour 220,000 square feet of roof construction every working week and to complete 1,500,000 square feet in the surprisingly short time of 60 days.

The experience in the construction of the project referred to led to the development of new methods of application of reinforced concrete for the purpose of reducing to the minimum the use of reinforcing steel, while maintaining the production-line method of construction. By adopting the principle of the arch in combination with that of the beam, such requirements were reduced to less than 3 pounds of reinforcing steel per square foot of ground area. A large plant in the Middle West has been constructed at the rate of approximately 200,000 square feet of roof area per week and with the expenditure of only 2.6 pounds of reinforcing steel per square foot of floor area.

The design of the original concrete structure described here was found to be economical only on a maximum span of 20x38 feet. By adopting the improved arch design, and without loss in time of construction, the column spacing was economically established at 38x40 feet.

The necessity for conserving critical materials has challenged the architectural profession to discover new methods of application, new economies, and new substitutes.

Victory Sash

Until recently, we have been designing buildings with monitors and fixed sash; now in many instances we are not even providing for monitors, because buildings can be constructed more quickly and at less cost without them. "Victory" sash, which was designed by a member of the Albert Kahn organization, and on which all patent rights were waived as a contribution to the war effort, is being used extensively. It is of wood, except for a few metal strips, and the saving of steel is a considerable item. The cost originally was high, but it has been reduced to a point where it is now lower than that of the steel which it replaced. With proper maintenance, it is quite durable, too, and there is reason to believe that the wood sash will remain in the construction program after the emergency has passed.

All luxury ventilation is denied. Air conditioning is being provided only where required by manufacturing or inspection processes. All duct work, which formerly was of sheet metal, now is made of composition materials, usually asbestos cement.

Major economies have been effected in electrical installations. Straight radial distribution now is favored, rather than the more complicated network systems, and high voltage is being used wherever possible.

Saving Materials

For lighting distribution, a 3-phase, 4-wire system, operating at 120/208 volts, is widely used, because it saves considerable material as compared with the single-pass system. Another system being used more than formerly is the 440-volt, 3-phase, 4-wire, grounded neutral arrangement applied in connection with special fluorescent lamp equipment. In lighting installations where fluorescent tubes are used, Bureau of Standards reflectors made of non-metallic materials are mounted in continuous rows, and the channel which is a part of the fixture is utilized for the circuit wiring, thus eliminating a separate conduit.

Plumbing equipment and fixtures are purely functional, and materials are severely restricted. No more brass or plated faucets are permitted; today's faucets are of enameled iron, with china or iron handles. All toilet seats are of wood, instead of hard rubber or plastic. Soil and waste piping are of light cast iron; sanitary piping is vitrified tile; drains are of asbestos cement. Galvanized pipe is permitted for hot water, but black iron must be used for cold water. Even fire-protection systems are limited in all save wood buildings and in critical areas. Precast cement manhole covers and strainers are being used to save metal. Kitchens and cafeterias are similarly restricted in the use of critical materials.

While many of the emergency changes are temporary, some will be continued after the necessity for conserving critical materials has passed.

Loading dock is floodlighted. The stack was on the property; the plant was built around it. Now, with conversion to coal, it is ready to use. Penthouse is new addition designed to house women's lockers

WALTER KIDDE

Designers and builders: Walter Kidde Constructors, Inc., New York

SLOW-BURNING mill construction was resorted to by Walter Kidde & Company for the assembly building which now stands a few hundred yards away from the main plant at Belleville, N. J.

Specifications called for a complete blackout structure using the most inexpensive materials and the absolute minimum of critical items. A single-story, windowless, timber-framed building was therefore indicated. The type of construction used is called "slow-burning" because it is exactly that; timber columns, girders, and joists are so massive that it is next to impossible for a fire even to get started.

For Five Years

The plan was to build a plant that would last for 5 years, say, and could then, after having served its purpose, be retired and torn down with a minimum of expense and loss. The result is a roomy, comfortable, efficient plant which will stand up, not just for 5 years, but for 10 years or longer, and which may be converted to any one of a variety of post-war uses. Kidde is making products – carbon-dioxide fire-extinguishing and inflation apparatus – that have tremendous peacetime possibilities, and the company may conceivably need the building itself after the war. If not, it will make a mighty usable bargain for somebody else.

The building is 700 feet long, 300 feet wide – a low structure containing 210,000 square feet of floor space. Firewalls divide it into three main areas – stockroom at one end, shipping at the other, production in the middle.

One of the problems was to give this close-to-the-ground plant some architectural character without spending any money. This was done most effectively by an exceedingly simple device. The walls are cinder concrete block, plastered on the outside with a ¾-in. coating of cement with a float finish. Horizontal courses of red brick have been introduced at building corners and other strategic points, the bricks projecting an inch beyond the stuccoed surface of the cinder block. These horizontal bands of color are further carried out by painted strips of the same width across such areas as the front of the loading dock. Another touch of color has been added by way of green paint at the roof line on the wood cornice.

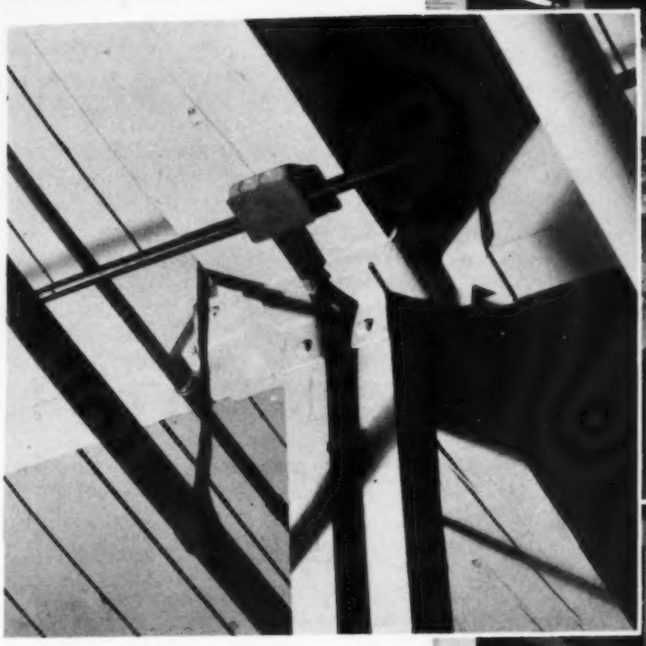
Cooled in Summer

Although the building could not be air conditioned – neither materials nor processes required it – it is nevertheless cooled effectively in summer by drawing water at 55 degrees from deep wells on the property and pumping it through coils and then circulating air over the coils. This cooling process is not helped in the least by the fact that the wood-deck roof has a black built-up covering, than which nothing could be a better absorber and storer-upper of heat from the sun's rays. All this is neatly counteracted, however,

Plant is of timber construction. Not air conditioned. But cooled by circulating air over coils containing 55-deg. water from deep wells on the plant property

Below, close-up of massive timbers used. Construction is of traditional mill type rightly known as "slow-burning"

Loading dock (bottom photograph) accommodates seven trucks

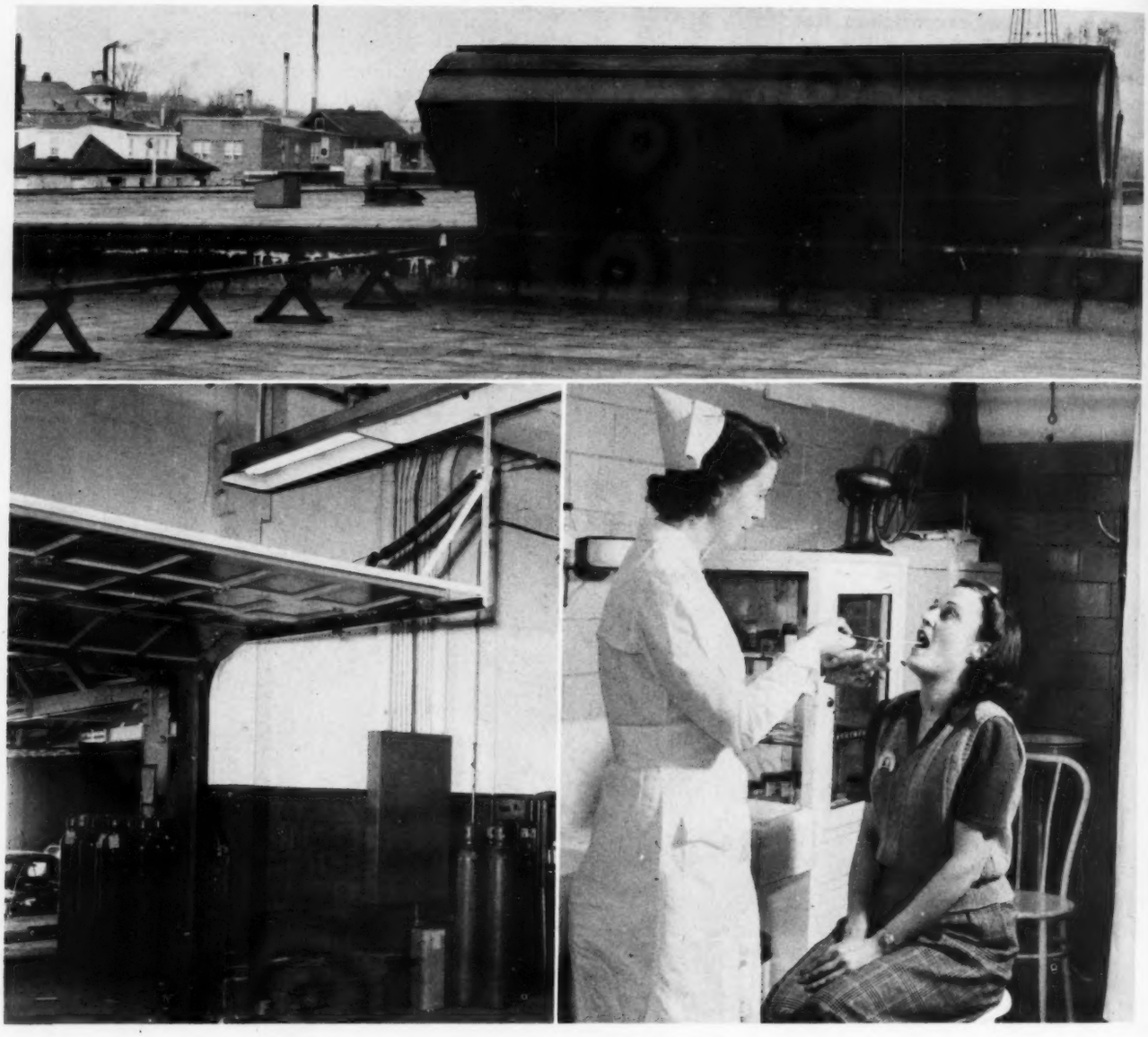


by spraying the waste water from the cooling system over the nearly 4 acres of what would otherwise be a distinctly hot-to-touch surface.

The hot-air heating system was designed for oil, but is now being converted to coal. And thereby hangs a tale. There was a stack on the property when it was acquired. It was a perfectly good stack. It would have cost several thousand dollars to take it down. Anyway, it seemed a shame to do that. Who knew what use the building might be put to after the war? The stack might even add to the value of the company property in some post-war era.

To make a short story shorter, the stack was left standing – *and the plant was built around it.* All of which was most fortunate, because now a stack is needed, and there it stands. It is even in the right place, practically over in a corner of the building where a boiler room can be conveniently located.

Fluorescent lighting in continuous-trough reflectors supplies the uniform 50 foot-candles of illumination needed



Water from the plant cooling system is sprayed over the roof (top) in hot weather, with a not inconsiderable cooling effect. Left, below, rolling door to loading dock. Right, scene in first aid room

at bench height for the precision assembly work that constitutes a major portion of the operations conducted in the building.

Floors in all work areas are cement finished with ironite used in the mix as a surface hardener.

Interior walls are cinder block without the cement finish that was used on the exterior of the plant. The inside walls are painted white with an olive green dado and a red stripe where green and white areas meet. This is the most economical finish that could have been chosen, and the color combination is a good-looking one. For permanent partitions, smooth hollow tile has been used. It is fireproof, practically soundproof, and extremely economical, and it provides an excellent surface for painting. Partitions of a less permanent nature – for offices, say, that may have to be enlarged or rearranged – are built up of wallboard.

Penthouse for Women

Women were provided for in the original plans. Locker room, washroom, and restroom for women were installed. It was impossible, however, to foresee the number of women who would be employed, and within six months they had outgrown their quarters. This difficulty has been remedied by adding a penthouse and moving the women's lockers up there. An inside stairway had to be built, of course, and a wide outside stairway has also been added for emergency use.

A loading dock is located on one corner of the building. It accommodates seven trucks at a time, and is totally inclosed so that loading operations can be carried on safely and comfortably in all kinds of weather. Overhead doors are hand operated. A monorail system with electrically operated and propelled hoist serves one end of the loading platform and a portion of the shipping and storage area. Floodlights over the entrance to the loading dock facilitate night work.

The men's locker room is commodious. Lockers are steel. There are five wash fountains with plenty of hot water. Floor is asphalt tile.

Other employee facilities include an excellent cafeteria in which well-balanced meals are served, and a well-equipped first aid room with registered nurse in attendance.

Designed for speedy erection and minimum use of critical materials

MECHANICAL HANDLING SYSTEMS

Designers and builders: Clearing Industrial District, Inc., Chicago. Architect: John Cromelin

THE ONE-STORY FACTORY built to house the ammunition division of Mechanical Handling Systems, Inc., Chicago, was designed for speedy erection with minimum use of critical materials, and for straight-line production by a working force that is largely made up of women.

An answer to the first consideration was found in standard mill construction of fabricated steel already on hand. Specially designed conveying equipment – the company's regular peacetime product is conveyors–makes straight-line production possible, and, by turning normally heavy work into light, provides for the employment of women on tasks that would otherwise be tagged "for men only." The percentage of female help employed by this company is already well above the average for the district.

The building was planned for expansion to the south. When the need arises, it can be doubled in size without interfering with current manufacturing operations.

For convenient movement of incoming materials and outgoing ammunition, there are two switch tracks, one inside and one out. The inside track is depressed so that loading and unloading operations are carried on at floor levels. Both tracks are serviced by a crane.

Plenty of Light

Generous use of glass in the exterior walls and in the monitor sections endows the plant with a maximum of natural light. Steel sash is installed throughout, both clear and obscure window glass being used. Filament lamps in RLM domes supplement the natural daylighting.

Floors are concrete. Roof is asphalt. Unit heaters of suspended type keep work areas comfortable. Woven wire fence surrounds the plant property, keeps out intruders, helps protect personnel and processes.

Provisions for worker health and comfort were not neglected. Toilets, washrooms, and locker rooms are located on balconies. Men's washrooms, for example, are furnished with wash fountains and showers. Locker rooms are equipped with overhead hangers so that clothing may be suspended from the ceiling and thus aired when not in use. A well-equipped and attractively furnished first aid room is located in a light, airy front corner of the building. It has an asphalt tile floor and is fitted with Venetian blinds, as are plant offices.

"Million-dollar woodshed" is faced with common brick. In foreground, a small portion of parking area

OHIO CRANKSHAFT

Architects and engineers: Wilbur Watson & Associates. Contractor: Sam W. Emerson Co., Cleveland

USE OF HEAVY-TIMBER and reinforced-concrete construction enabled The Ohio Crankshaft Company, Cleveland, to erect its third major wartime addition in record time. Built at a cost of more than $1,250,000, the huge new structure was in operation just three months from the turning of the first steam shovelful of dirt. In fact, the first completely machined automotive crankshaft was shipped three months and two days from that starting day.

The new building is actually two plants in one, divided equally between the machining of heavy-duty automotive and diesel crankshafts for ordnance vehicles, and of aviation crankshaft components for 14-cylinder radial engines. The aviation division amplifies by many times the capacity of another aviation crankshaft plant built 2 years ago at a cost of $5,000,000.

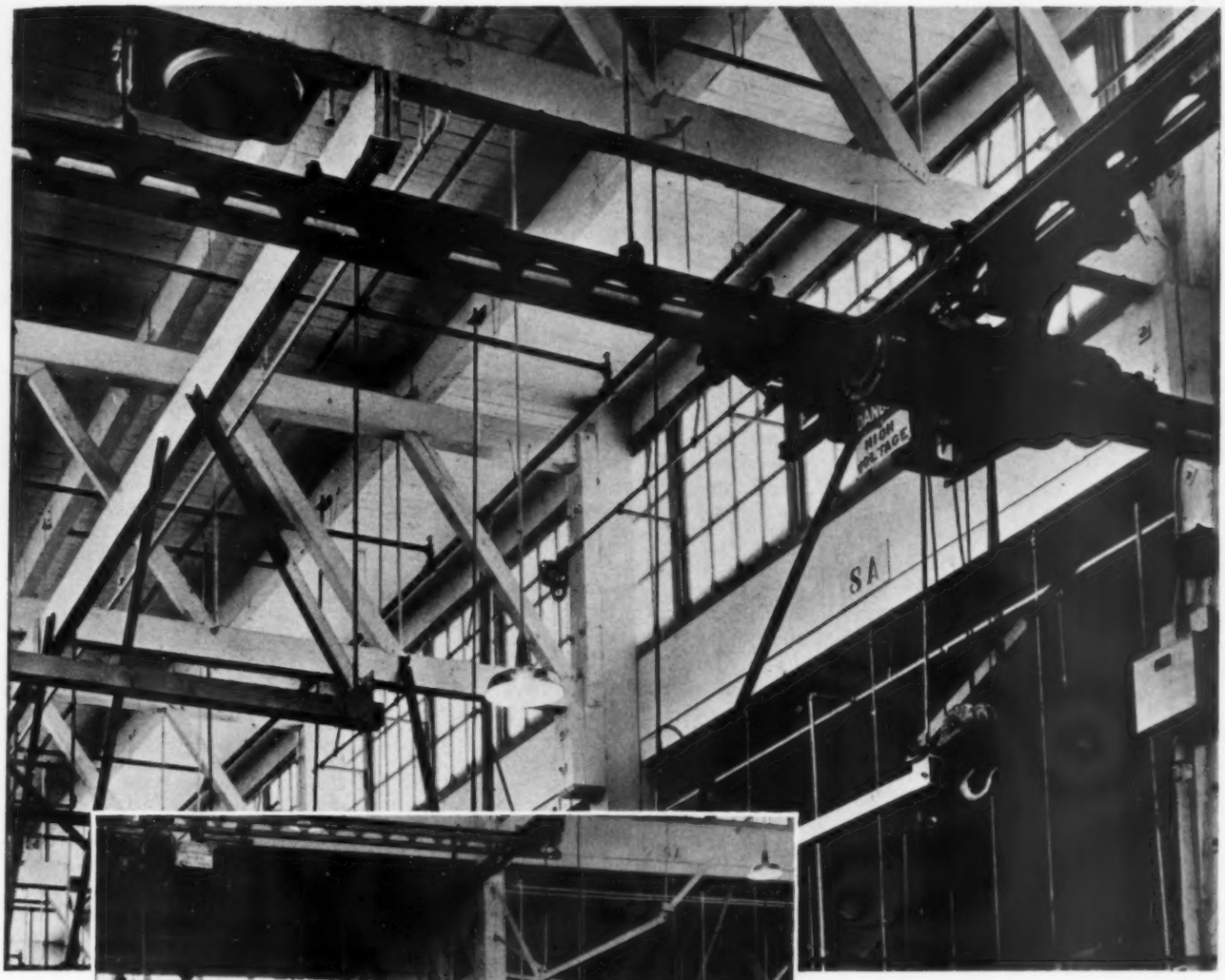
The planning that went into the "million-dollar woodshed," as it is familiarly spoken of, has resulted in straight-line flow of parts down the machining lines. Rough forgings are trucked into one end of the building and are unloaded on two hydraulic floor lifts of 10-ton capacity set strategically in the plant's inner driveways. There is no outside shipping or receiving dock. Driveways are 20 feet wide with ample clearance. Two-ton overhead electric cranes serve each of the lifts.

Nothing Fancy

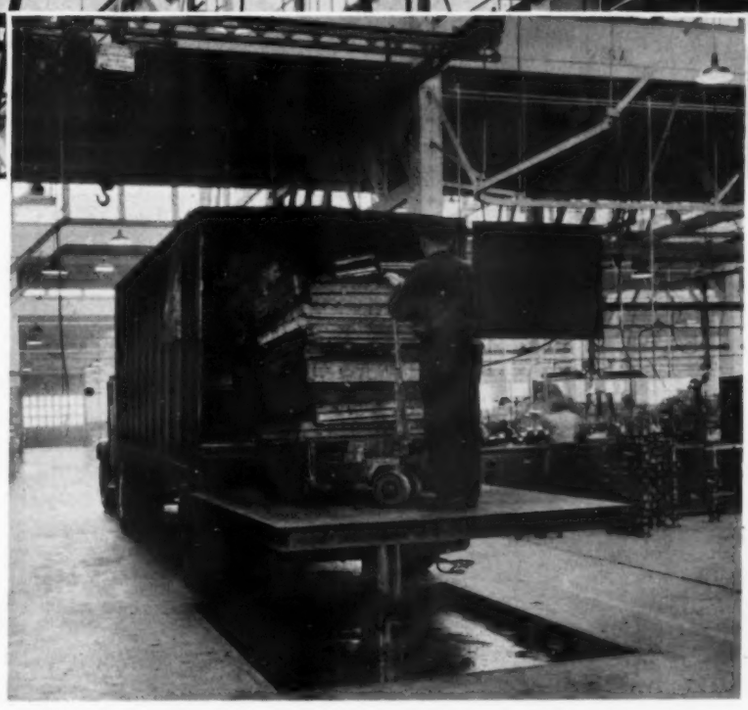
Simplicity characterizes the outer appearance of the structure. Common brick is used for the facing walls on all four sides. Restrictions on stone for framing or capping deprive the facade of any embellishments except for stone sills beneath windows. It is a serviceable factory built for war purposes, but lacking in some of the distinctive touches which enhanced the appearance of earlier war plants. Only concession in this direction is the modern front entrance, with its four brick columns rising to a point above the second floor.

The plant proper is a one-story monitor-type structure of wood columns and trusses, with wooden 4-section window frames set in the brick sidewalls at intervals of 4 feet. Windows extend continuously across the front of the headhouse on both floors. In the factory sash and monitors, ⅛-in. obscure hammered glass is installed. The pivoted-type window is used for locker rooms and rear headhouse; lift-type in the front headhouse; and standard factory sash with gang operators in the plant itself along outer walls and in monitors.

More than 200 12x12-in. 30-ft. columns are used throughout the factory area. Columns and trusses are Douglas fir. Purlins are No. 1 yellow pine and Douglas fir; sheathing and framing, No. 2 yellow pine. The big beams were cut in Oregon, Minnesota, and



Detail of high bay shows heavy timber columns and trusses. Power from 11 rows of bus duct, each 420 feet long. Automatic sprinklers. Unit heaters. And lighting that insures a minimum of 18 foot-candles at work levels



Trucks drive in. Hydraulic lift facilitates loading

Kentucky. Trusses were assembled on the site of the plant as construction proceeded. The north and south headhouses are entirely of reinforced concrete construction with brick walls. Only beneath the mezzanine locker rooms, which extend the full length of the shop area on both sides of the building, are steel beams to be found.

Twelve 30-ft. bays, well illuminated by monitors and equipped with overhead lifts and gravity conveyors, provide ample room between the machining lines.

Floors are heavy reinforced 6-in. concrete treated with three applications of hardener. Under certain floor sections where heavy machines are placed, the floor is supported by footings sunk 20 feet below floor level. Twelve-inch drainage trenches run the length of the machining lines to carry off waste and spillage.

Heat is provided by two 250-hp. stoker-fed steam boilers having a combined capacity of 85,000 square feet of equivalent direct radiation. The boiler room is a separate unit with coal stored in underground bunkers of 300-ton capacity. Horizontal projector-type unit heaters controlled by thermostats and aquastats provide factory heat. In the mezzanine locker rooms, vertical unit heaters are installed. The office area has direct radia-

tion units, individually controlled.

Illumination of the factory is set to insure a minimum of 18 foot-candles through use of four 300-watt units in the low bays and two 500-watt units in the high bays for every 600 square feet of floor space. RLM domes with turnbox fittings are installed on the fixtures. Inspection tables and offices are lighted by fluorescent fixtures. Outside protective lighting consists of 500-watt floodlights located above the second-floor windows at 60-ft. intervals around the entire building.

Lighting feeders are 440 volts with dry-type transformers to step down the current to 220/110 volts at distribution points. General lighting is controlled through three lighting breakers.

Current at 11,000 volts is fed into the building by two cables so controlled that power can be taken from either one. Power is stepped down by two 1000-kva. 11,000/440 volt transformers and by two 150-kva. 11,000/2300 volt transformers. The 440-volt leads to distribution switchboard panel are controlled by 10 breakers. On the 2300-volt line, one main breaker leads into four sets of disconnecting switches which control use of this power.

Power distribution throughout the plant is carefully worked out. Distribution through four sets of feeders to eleven rows of a.c. bus duct each 420 feet long provides easy connections for all machines. It is necessary only to plug into a duct, and each plug is individually fused. Direct current is distributed in this same fashion.

Fire Precautions

In a wooden structure considerable emphasis needs be placed on fire prevention. Automatic sprinkler systems, connected with outside alarms, cover the entire building. Standpipes are placed about the plant with standard 2½-in. hose connections, while within and on the roof are an additional fourteen 1½-in. standpipes with hose lines. Special chemical fire extinguishers are placed in large numbers throughout the factory and office areas.

Air in the 70x40-ft. generator, control, and compressor room is changed by means of an exhaust fan that draws air from the room into a 4-ft.-sq. duct and blows it at floor level into the nearby transformer room. Fresh air is drawn in from outside. This is a ventilating procedure distinctive of these particular operations.

There are two air compressors which run alternately. One air receiver is provided, and a 6-in. header which runs the entire width of building acts as a storage line as well. Laterals running from this header throughout the factory at 30-ft. intervals parallel machine lines to provide excellent air distribution.

Other features incorporated in the factory include modern locker room facilities for approximately 1500 workers. Located on the mezzanine floors are rooms for men (1050 lockers) and women (450 lockers).

A lunchroom section with tables and canteen is adjacent to the factory area. Workers bring their own lunches or can buy them at the canteen. Women have lunch tables in their locker rooms.

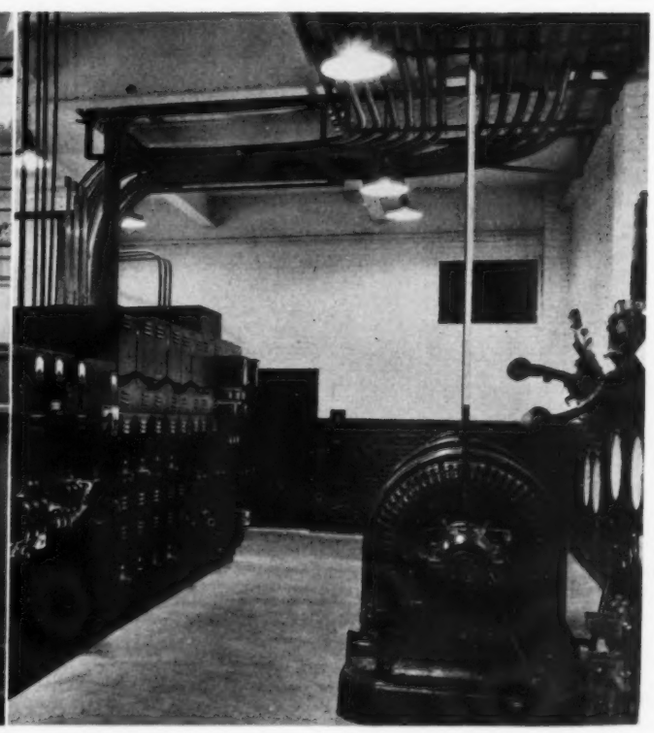
The modern dispensary, 30x20 feet, is equipped with filtered-air ventilation, fluorescent lighting, and all necessary medical aids.

Toilet facilities are located in the monitors. Five toilets serve the working force. The locker rooms are also equipped with toilets.

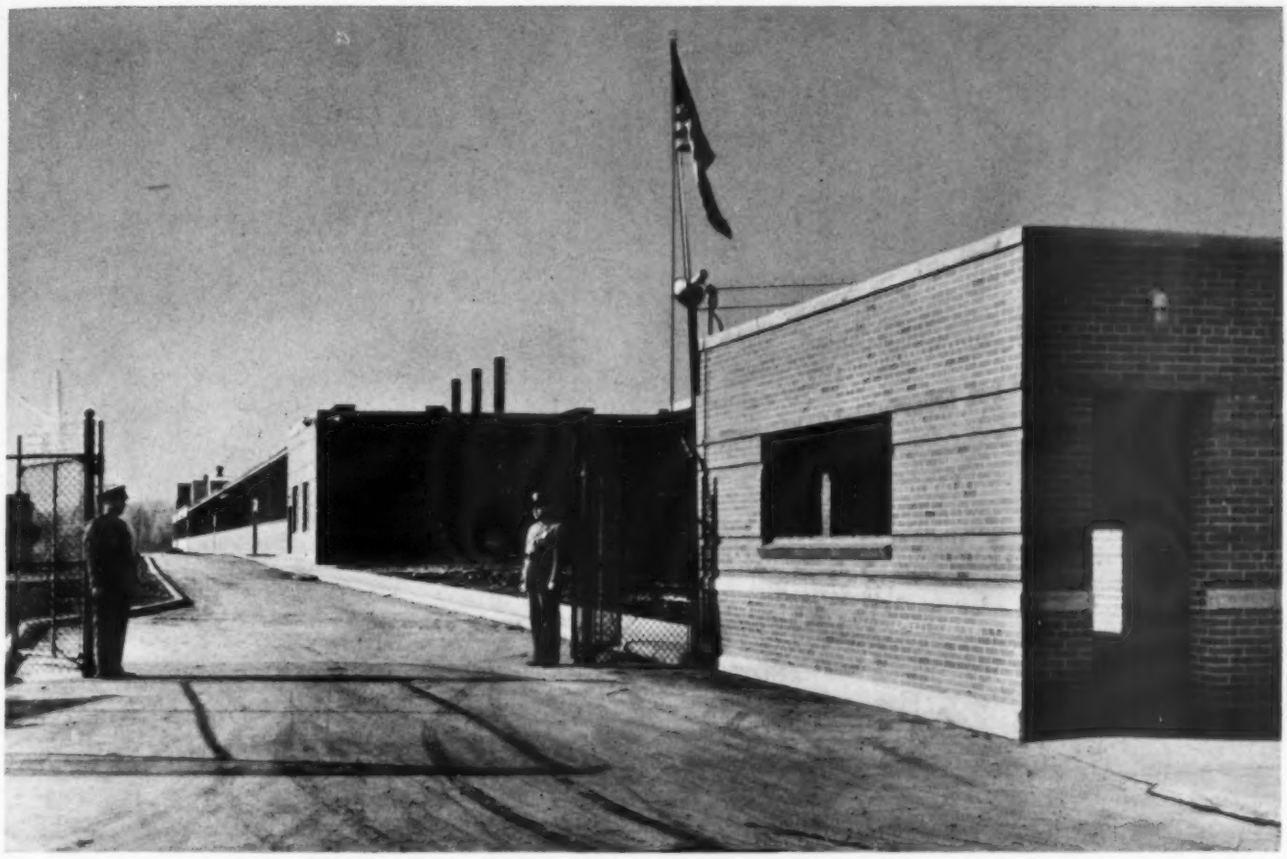
What was planned for factory purposes on the second floor of the front headhouse has been converted to office space used by the personnel and training departments. Asphalt tile covers the floor. Fluorescent lighting is well distributed. Offices and classroom partitions are wood and glass.

The roof deck of the entire building is covered with 1-in. insulation. Roofing is of 15-year bonded, 4-ply, tar-and-gravel type. Ventilating the entire factory, headhouses, and mezzanines are 20- and 24-in. roof units with motor-operated louvers and fans.

In offices, fluorescent lighting, wood and glass partitions, concrete floors surfaced with asphalt tile



Panelboards and one of the two motor-generator sets used to convert alternating to direct current



Cyclone fence, topped with barbed wire, surrounds plant, seen here through main gate

CORNING GLASS

Architect, engineer, and builder: The H. K. Ferguson Co., Cleveland

ONE OF THE LAST BUILDINGS constructed before the use of structural steel was seriously curtailed in early 1942 houses the optical glass manufacturing activities of Corning Glass Works in West Virginia. Experienced glass men say it is one of the largest plants of its type in the world, and one of the most attractive.

Like most industrial buildings, the structure was designed around its process. Its utilitarian value is self-evident on first sight. There are no frills, no fancy embellishments. The building has a certain function to perform, and the simplicity with which it carries out its job makes it stand out among the newer plants as a beautifully engineered bit of construction.

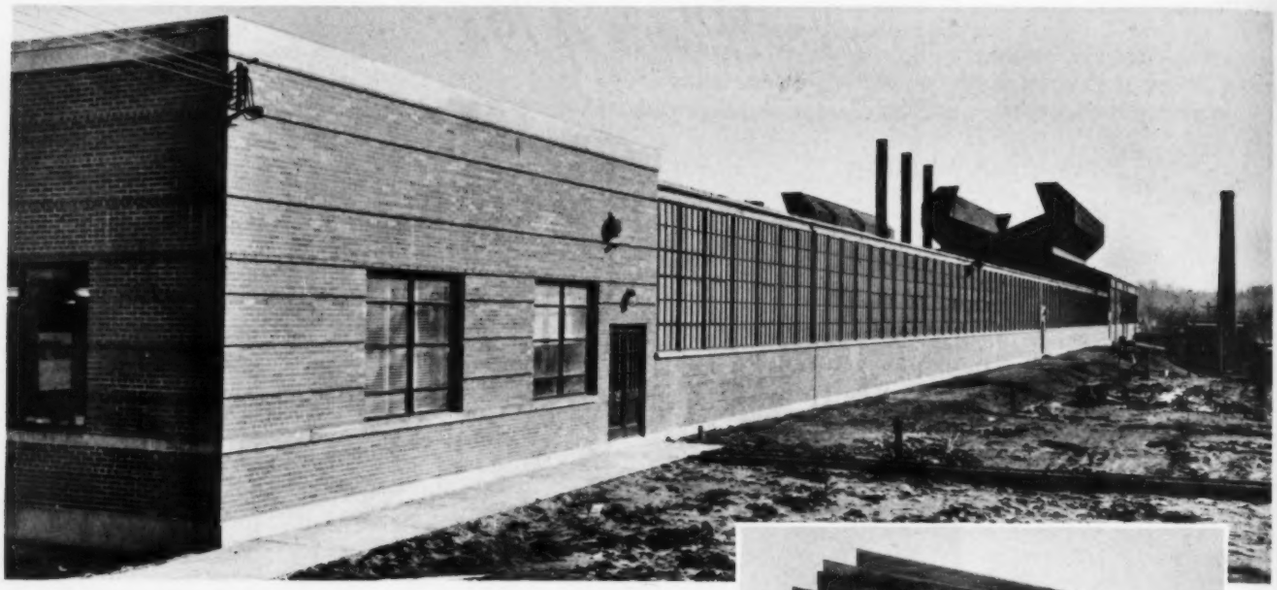
Process details are military information at the moment. However, it may be said that most of the operations are exactly what may be expected in the manufacture of optical glass. There are immense furnaces, jutting up through two stories; there is a solid 200-ft. row of preheating furnaces spanning the entire width of the structure; there are rows upon rows of annealing kilns, ovens, and grinding and polishing equipment.

The building contains approximately 200,000 square feet of floor space. It is built to suit topographical conditions, and includes a single-story section and a 2-story section, the latter built on the side of a hill.

High temperatures gave engineers several interesting problems. Mammoth ventilators were used in the V-type monitors over the furnaces, and a specially designed "man-cooling system" was used to protect workmen tending the furnaces. This was accomplished by installing a duct in the floor located at a suitable point between the workman and the furnace. When it is necessary for one of the operators to move in close to the furnace, a screen of air emerges from the floor and serves as a protection from the intense heat.

For Worker Health

Another interesting feature with distinct utilitarian value is the dust-control system, which is of the bag-collection type, and is highly important



West side of plant, looking from front to rear. Spandrel walls are red face brick. Sash is continuous factory type, which allows great quantities of natural light into the building. Heat valves on the rear roof illustrate extent of efforts to handle ventilating problem. Also in the rear, at the right, are power house and stack

Simplicity and economy characterize the design of the main entrance at the Corning plant. Simplicity is the theme carried throughout the entire structure, with much emphasis placed on the conservation of critical materials

Railroad spur and loading platform are at the rear of the factory. Lower-story walls are concrete and glazed tile; upper-story, corrugated asbestos and factory sash

Manufacturing process calls for plenty of clear floor space. Sash in monitor allows maximum amount of natural light. Roof is fire-resistant concrete plank; purlins are steel. Easily located telephones assure quick communication at all times. Floors are concrete

Insulation is yet to come on annealing kilns. Top covers of kilns are supported from overhead trusses. In this section, roof is of wood with composition covering; floor is concrete. Floor boarding beside kilns is temporary, will be removed when work is completed

to maintain health standards in a plant of this type.

The front part of the building is devoted to office needs. A miniature hospital has been set up, and is especially equipped to handle cuts from glass—the most frequent complaint, although safety measures are holding accidents to a minimum—and other industrial casualties. The offices are separated from the plant proper by ceiling-high metal partitions which run the entire width of the building. They are heated by unit heaters, which are supplied with steam from an adjacent power house. Lighting is fluorescent.

Floor space devoted to manufacturing is divided into sections through

Looking upward through structural steel supports. Light shines through heat valve over a battery of furnaces. Pitch of valve may be regulated in accordance with temperatures in the plant. Wiring is inclosed in conduits because of the heat below

A long corridor separates executive offices from manufacturing activities. Partitions are of metal and glass — obscure glass on left, to prevent distraction of employees' attention. Because of high temperatures required for glass processing, plant is well sprinklered. In addition to main entrance, there are exits at both ends of corridor

the use of cyclone-type fencing, although some specialized sections, such as grinding and polishing departments, are partitioned off.

Clear floor space is one of the most noticeable features in the interior of the building. Spans in the furnace room are 80 feet long, and a first impression of the structure is its roominess — a feat accomplished through proper design in spite of its compactness as a manufacturing unit.

The building faces north, and lighting is helped greatly by the steel-sash windows which run the entire east and west lengths. Overhead incandescent fixtures augment the natural lighting, and the interiors, including walls and steel trusses, are covered with a light-reflecting paint. Spandrel walls are red face brick throughout the single-story portion and corrugated asbestos siding in the 2-story section.

Floors are concrete with an asphalt tile topping in the offices, and the roof is wood and gypsum plank with a bonded composition covering.

A gatehouse and power house were also constructed to service the main building.

Today's Trends in Design—III

By GEORGE A. BRYANT
President, The Austin Company, Cleveland

AMERICAN INDUSTRY'S RESPONSE to the full impact of war in 1942 is permanently recorded at the plants designed and built to keep pace with the demands of our armed forces.

Faced by critical shortages of many materials which the construction industry and production executives had regarded as indispensable, architects and engineers have converted many commonplace materials to new functions. At the same time, long-established material producers have thrown the full strength of their research organizations into the development of substitute building products which eliminated critical metals. Complete strangers to the field have developed pipe, lighting equipment, insulating materials, and other new products, many of synthetic character, to meet the new needs.

Useful for Peacetime

The circumstances that have forced the adoption of new materials and new construction techniques have disclosed unsuspected strength, wearing qualities, and beauty in many a material which has proved its right to a continuing place in permanent construction when peace comes.

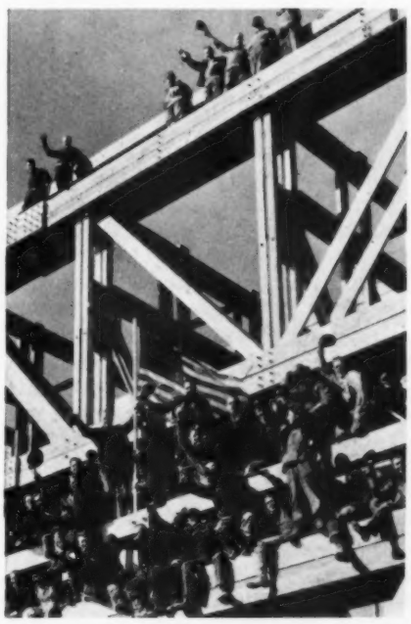
I draw upon the recent history of my own organization for examples. My statement is dramatically illustrated in the sequence of design at four large aircraft assembly plants. The first two, authorized early in 1941 when there was more than enough steel to go around, employed fiber glass and steel in windowless sidewalls and roof to obtain the highest possible degree of insulation and acoustical control; a new type of rectified fluorescent lighting for 24-hour illumination; and white cement on the assembly floor to reflect light on the underside of aircraft in production. One of these plants has since been enlarged by the addition of a huge parts plant of the same construction which makes it the world's largest controlled-conditions building and one of the largest factories.

The third plant, authorized in the spring of 1942, substituted solid masonry sidewalls for the steel and fiber glass, and special non-metallic fluorescent lighting fixtures with a new type of operating mechanism that saved more than 200 tons of steel, copper, and aluminum. This plant saved several thousand tons of structural steel by a rearrangement of layout which made it possible to accommodate production in an assembly bay of relatively narrow span.

The fourth plant, authorized a few months later, after the steel shortage had become critical, went to an all-wood building, shorn of every pound of metal that could be eliminated. It substituted plastic pipe for steel and cast-iron pipe; wooden pipe for pipe of reinforced concrete in drainage systems; composition board for steel in ventilating ducts; and so on down the line. Where the first three plants were air conditioned in the interest of uniform production efficiency despite the wide fluctuation in natural temperature and humidity in the sector where they were built, the fourth plant was located farther north where the need for air conditioning is at a minimum, and gets along without it.

When the lumber industry was swamped with business beyond its capacity, it was found that concrete and plastics could be made to supplant wood in many places. Concrete caps, for instance, were used instead of wood to distribute the load from the floor framing to columns in huge warehouse buildings. With the limited supply of big timbers available, efforts were made to provide columns, crane girders, and beams by laminating 2x4's and 2x6's. Beams and girders laminated in both directions gave under early tests, but a new glue solved the problem. In some instances, lamination finally gave the desired strength with as much as 30 percent saving in the actual amount of lumber used.

Whereas access roads and parking areas had been the only traffic problem until gasoline rationing came along, the volume of employee traffic to and from concentrated traction and bus-loading stations now calls for special facilities at many plants. In some instances these needs have been met by overpasses, elsewhere by tunnels, either of which permits an uninterrupted flow of motor traffic past the plant and at the same time insures safe travel of employees to and from the loading platforms. While the changed transportation picture has greatly altered the whole problem of plant location, the new conditions have been generally recognized as temporary and have been met by provisions for special bus service, frequently with shuttle operation to established lines.



Structural workers cheer completion of their part of the job at Douglas all-wood plant

Safety Provisions

At strategic war plants in our coastal areas, provisions have been made to safeguard employees against possible aerial attack in bomb shelters of reinforced concrete, so distributed as to be readily accessible from building exits without impeding production or normal traffic arteries.

In the face of all the special needs of war, industry has maintained, without compromise of fundamental principles, the design standards that have made the modern factory a structure in which men and women can work efficiently and safely to meet production needs in war or peace.

Unusual because it is a single-story plant built of concrete

WRIGHT AERONAUTICAL

Architect: Albert Kahn Associated Architects & Engineers, Inc., Detroit

THE WRIGHT Aeronautical Corporation's Cyclone engine plant now nearing completion in New Jersey was the first to be constructed by what has been termed the "warspeed" method, an adaptation of an older design for using movable forms to pour large concrete sections. So far as known, no one ever before built the complete structure, including slabs, girders, and columns, on a traveling-form basis, as was done here, and probably the production-line principle was applied on this job more economically and to a greater extent than ever before in the building industry.

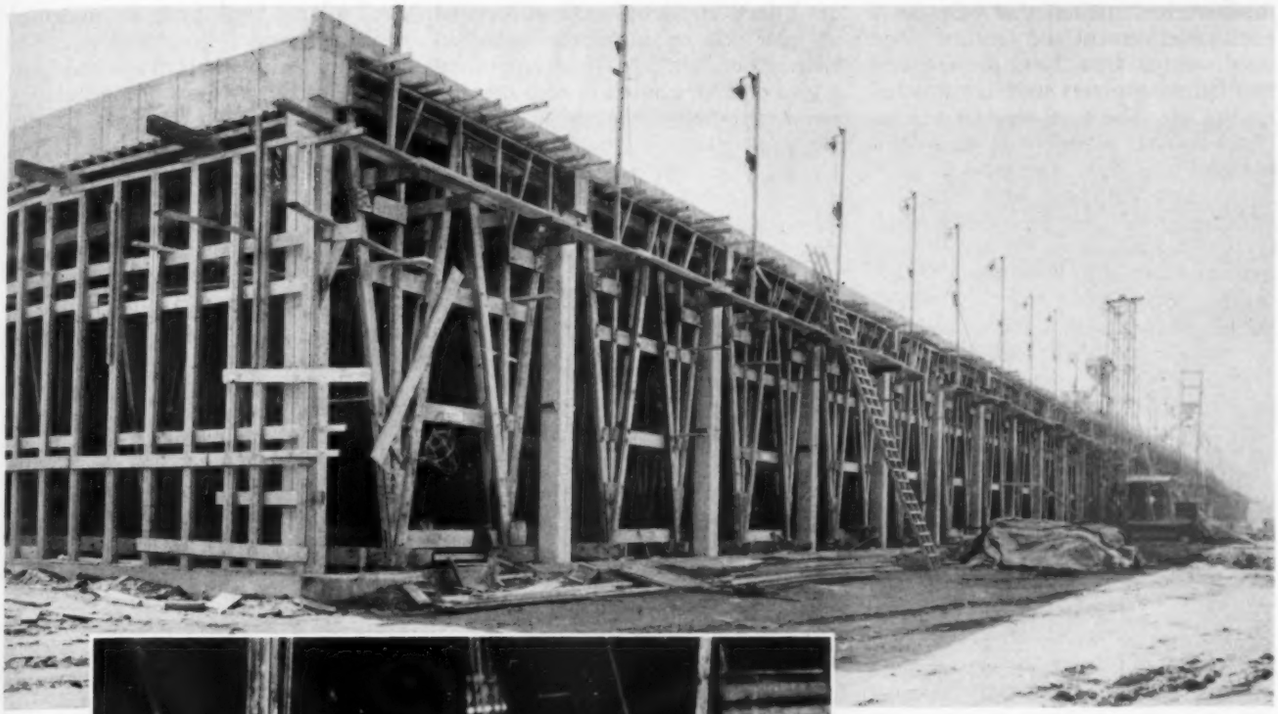
The project is also unusual in that the single-story factory is built of concrete, which heretofore in the industrial field has been used principally in multi-story construction.

When, early in 1942, this manufacturer was commissioned by the government to expand production facilities for the Wright Cyclone 14 airplane engine by erecting a new plant, consideration was given to such factors as economical use of strategic materials, availability of labor, proposed use of the building, comparative costs of different types of construction, and desirability of fireproof construction. Conferences were held with representatives of all interested parties, including the Defense Plant Corporation and the War Production Board. As a result it was decided that a reinforced concrete structure, with masonry walls, and of windowless type, would best meet all requirements.

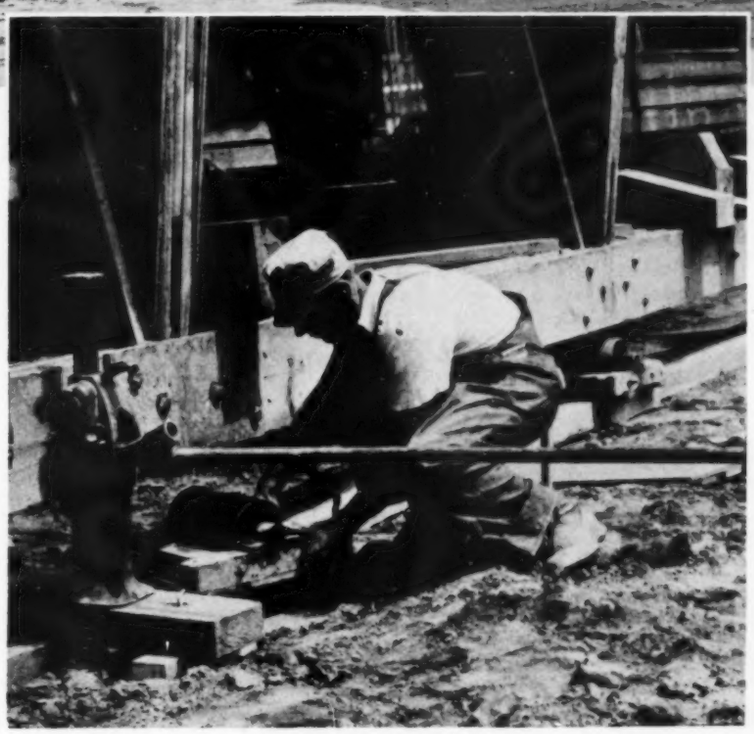
Such a plant probably could be completed before the steel for one of conventional type could be secured, even if steel were to be had; would meet all requirements for strength, durability, and fireproof construction; would permit employment of many crafts instead of depending chiefly on one; and would be more economical than any of the other types considered.

It Costs Less

Estimated costs per square foot were $3.478 for wood truss with plank roof; $3.419 for structural steel; $3.328 for reinforced concrete with beam and girder construction; and $2.911 for "warspeed" concrete beam and flat slab type of construction. It was further estimated that the saving of steel would total 5200 tons, or enough to build a cruiser, and that another 440 tons of steel and 7600 pounds of bronze would be saved in the sprinkler



Traveling forms, three bays long, with supports built of W-shaped bents, were used ten or more times on a 6-day schedule



On house-movers' rollers, forms were towed into position by tractors and jacked in place

system alone, as compared with fire-protection requirements of a wood-truss building. Then, too, if wood had been adopted, it would have been necessary to transport approximately 440 carloads of lumber a long distance, thus placing an additional burden on the transportation system, whereas materials for a concrete building could be secured nearby.

The manufacturing building is a large one-story concrete structure, with 3-course brick walls. The brick walls keep out the weather and improve the appearance, but do not support the roof. There is a mezzanine along one side for offices. A cafeteria, toilets, and locker rooms are located in the basement, which has a floor area of about 300,000 square feet. Employees enter and leave through a passageway which extends the full width of the basement, thus avoiding traffic in the work areas on the ground floor.

The form supports were constructed with W-shaped bents, supported on rollers and jacks, with beam sides and bottoms hinged to facilitate decentering. The use of this type of form and a quick-setting cement made possible the pouring of large areas of roof, and forms could be removed within 36 to 48 hours without resorting to re-shoring. As a result, it was possible to pour as much as 220,000 square feet of superstructure per week.

Not only that, but the forms were used ten or more times and could have been used even more times by prolonging the job somewhat. The form adopted was three bays long and was adapted to 50 days' pouring. This was chosen in preference to one only two bays long that would have permitted fifteen uses but would have required 80 days for pouring.

A complete set of such forms was used in each of the 20-ft.-wide bays, and the full line of 69 sections advanced across the building area. Pavers mixed the concrete for columns and roof, and delivered by tower hoist, mounted on the mixers, to buggy-loading hoppers located at the front of the forms. Truck-mounted mixers were used for placing all concrete other than that used above ground.

The traveler forms were built of

medium-sized timbers that were easily obtainable; cement and crushed stone were secured from local dealers; and two batching plants were constructed on the site. The total amount of concrete used in little more than two months was approximately 300,000 cubic yards. Using the same forms ten or more times not only saved much lumber but also saved the time of carpenters required to build them. Then, instead of using steel rails and wheels on which to move the forms, ordinary continuous mud sills were used for track, with house-movers' rollers for wheels. Forms were towed into position by tractors and jacked in place by a crew of workmen who soon became very proficient. To move the forms, it was necessary to lower them only a few inches, as there were no overhead obstructions.

The original schedule for each form was 6 days, including 2 days for curing, but as the workmen became more proficient, and quicker methods were developed, this was reduced to 5, then to 4, in some cases to 3½ days.

The entire building was constructed as an open shed, then the floor was poured and brick walls were laid after forms had been moved. The floor is plain concrete, 8 inches thick, covered with 2-in.-sq. wood blocks, except over the basement areas, where it is reinforced concrete.

Roof slabs spanning the 20-ft. bays are 8 feet, 10 inches wide, suspended at each side on cantilever haunched slabs. Beams are capable of supporting a load of 2000 pounds at each quarter-point, thus providing ample strength for monorail conveyors or other loads. Columns are reinforced concrete, are a minimum of 21 feet high, and are 18 inches square. They rest on concrete piers 24 inches square. Footings are plain concrete.

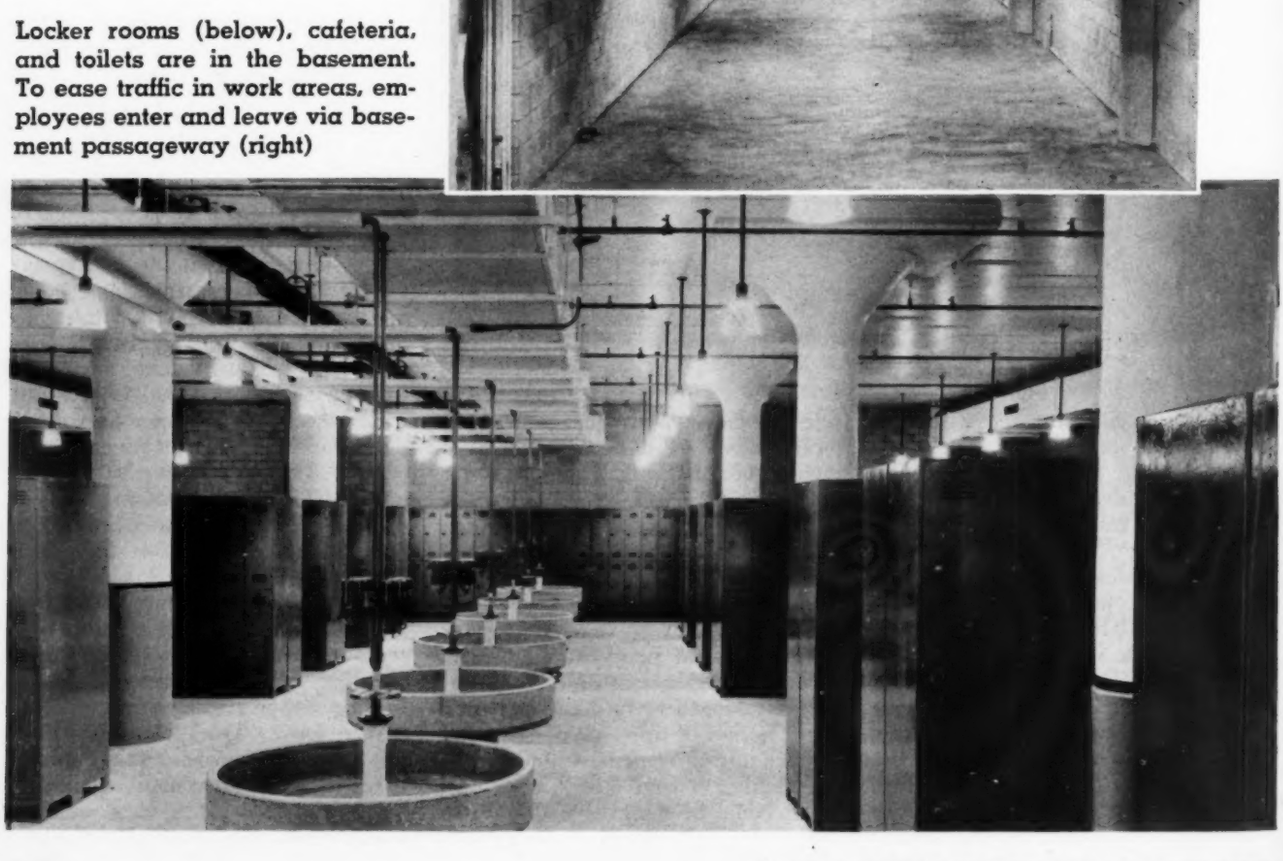
Ready for Work

As the traveler forms moved forward, they were followed by floors and walls, then by machines and men, so that, by the time they were approaching the far end of the building, operations were already getting under way in the near end.

The several other buildings included in the project are also concrete, but of different type of construction.

The power plant houses four boilers. All are coal fired by underfeed stokers. Steam is generated at 175-lb. pressure and piped through two 12-in. mains to the manufacturing building, where pressure is reduced to 100 pounds and the steam is distributed at that pressure. Governors reduce the pressure to either 40 or 25 pounds for process work or heating.

Fresh air, as well as heat, is supplied in the manufacturing area by horizontal-type heating and ventilating units suspended from the ceiling, set in rows in alternate bays running across the entire length of the plant. Units are of 15,000-c.f.m. capacity, and are of the two-speed type, the high speed being used in summer, the low in winter. Between the rows of units is a row of propeller-type exhaust ventilators which exhaust through roof units equipped with lightproof louvers. The entire system is designed to provide six changes of air per hour in summer and three in winter.



Locker rooms (below), cafeteria, and toilets are in the basement. To ease traffic in work areas, employees enter and leave via basement passageway (right)

Air conditioned office building dominates one approach. Buff face brick in sidewalls is separated by bands of continuous sash on the second floor, and by panels of sash and glass block on the first

BELL AIRCRAFT

Designer, engineer, and contractor: The Austin Company, Cleveland

COMPLETION of Bell Aircraft Corporation's new plant, recently rounded out by a large addition designed to provide completely integrated facilities, illustrates the extent to which a factory building can be planned around basic principles for the mass production of aircraft.

Authorized by Defense Plant Corporation before the forced curtailment in the use of steel and other critical materials, the plant proper provides the finest of engineering and business offices, highly efficient production facilities, and the most complete accommodations for employees.

The production area conforms to a basic layout adopted for the assembly plant, which went into production in the middle of 1941. It is of steel-frame construction with 5-in. reinforced concrete floors, and has a roof consisting of 2½ inches of reinforced gypsum poured over 1-in. insulating board, with 4-ply tar-and-gravel surface.

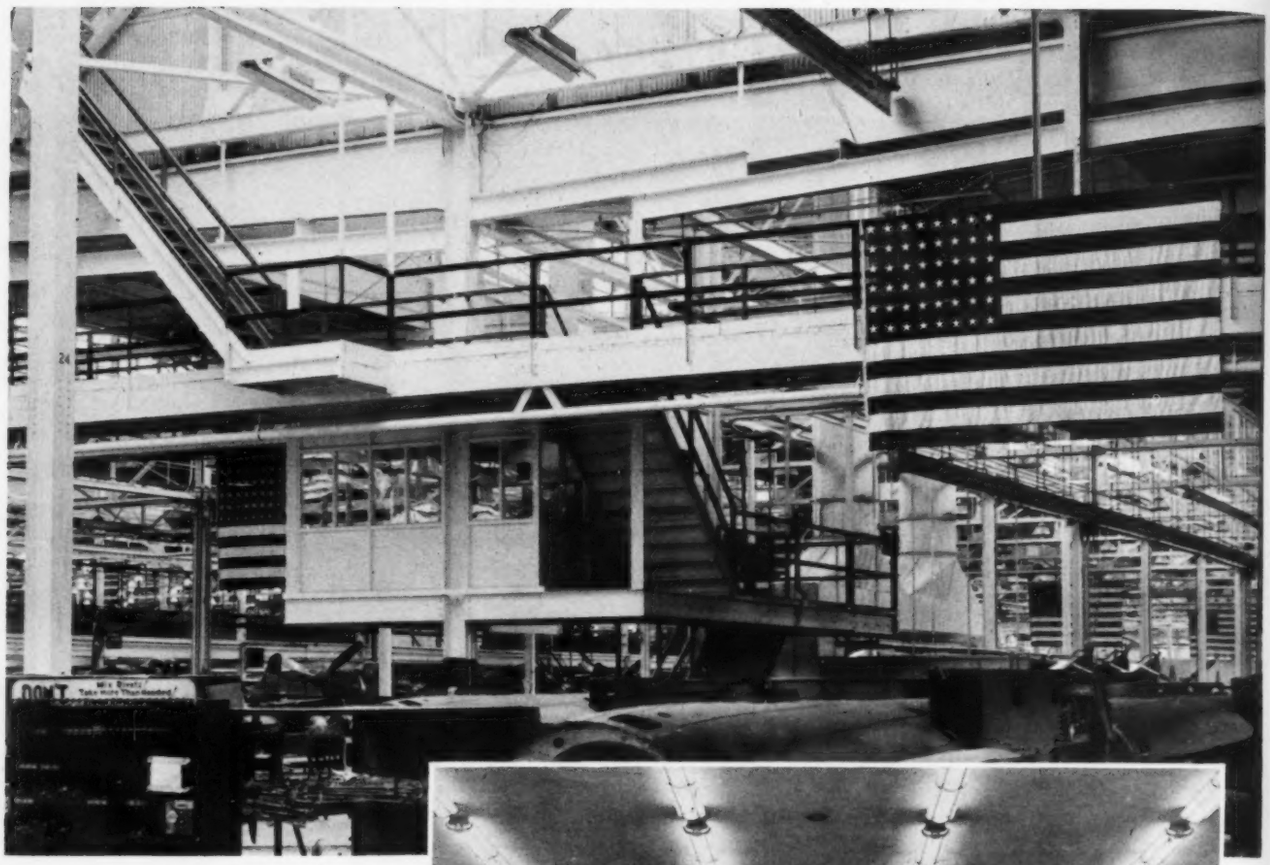
Mezzanines on either side of a conveyorized production area extend the full length of the plant. Columns are spaced 25 feet apart along the length of the building, with spans varying from 50 feet in the new portion to 100 feet in the original assembly plant, which terminates in an unobstructed area 200 feet square.

Parts and subassemblies produced on and below the mezzanines are fed to conveyorized assembly lines extending through this central area. A number of parallel drag-chain conveyors, recessed in the floor, propel the assembly fixtures from station to station along the final assembly line, which occupies more than half of the central area. An overhead chain conveyor, which reaches both mezzanines and the main production floor at various specified locations, provides the means of transporting materials from the master stockroom or raw stores at one end to the various parts and subassembly departments or between such departments and positions alongside the central assembly bay. This conveyor is equipped with steel baskets and other carrying rigs adapted to the handling of light materials and small parts.

All work on tubing and control systems, Plexiglas, and cabin superstructures is now concentrated on one mezzanine, where ultimately the plaster pattern and wood shop will also be accommodated. A long aisle, with a 5-ton bridge crane extending full 2-story height beside this mezzanine, serves the pattern foundry, hammer shop, and general maintenance department. It is separated from the plant proper on the first floor by a wall of acoustic block.

The opposite mezzanine includes offices and laboratory facilities, as well as complete photographic department; visual training and classroom facilities; plant engineering, planning, production control, material control, tool design, time-study, and inspection departments; timekeeping and accounting offices. The largest single area on this mezzanine accommodates the mold loft department, in conjunction with which special vaults and templet storage facilities have been provided.

The 2-story air conditioned engineering building is an outstanding example of functional design, and conforms in its exterior treatment to the



Production control office in the middle of Bell Aircraft's new plant, where fixtures start along the conveyorized assembly line, commands a sweeping view. Stairs from office, which is on a platform 12 feet above the floor, give access to walkways extending between mezzanines across main production area

High-ceilinged drafting room is just an economical factory cross-section. Finished appearance has been obtained by providing suspended acoustic ceiling with continuous fluorescent fixtures; by inclosing monitors with bands of glass block; and by plastering walls and columns

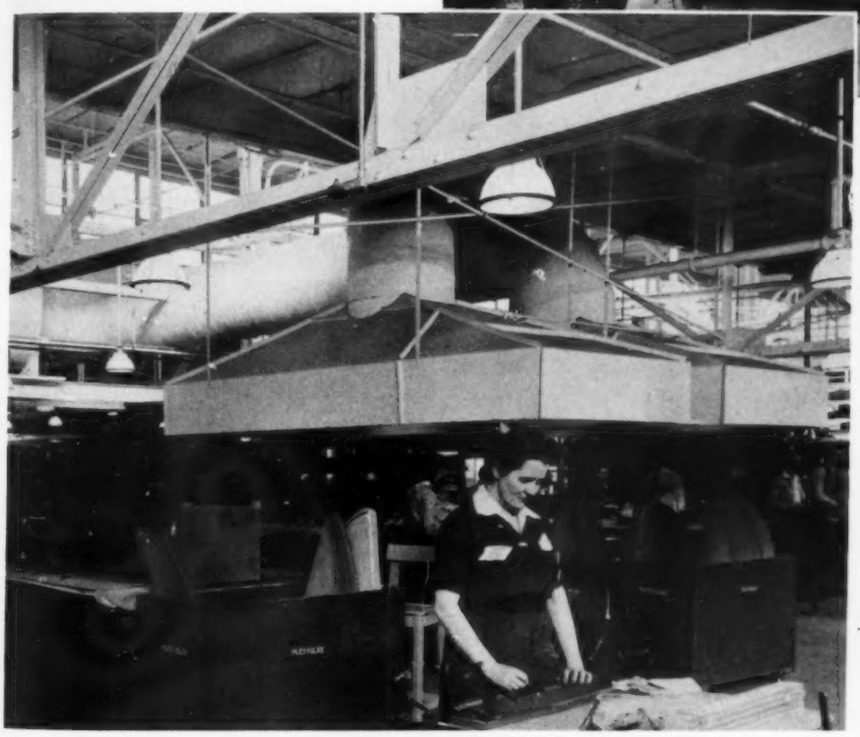
modern note set in the original assembly plant and followed in its recent expansion. Buff face brick used in the sidewalls is broken by a band of continuous sash at the second-story level and by a band with alternating sections of glass block and sash on the first floor. Limestone sills and coping and metallic heat-reflecting screens emphasize the band effect.

The entrance detail, executed in limestone and glass block, is framed in an impressive angle formed by a shaft of glass block recessed in limestone. This rises to the full building height below the flight control tower and is continued atop the coping to form a right angle outside the glass-inclosed observation booth. A darker brick used to introduce contrast in the sidewalls at the entrance has been carried throughout the monitor section inclosing the large drafting room on the second floor.

The drafting room, which is nothing more than a standard monitor cross-section superimposed on a 1-story flat-roof structure, illustrates the adaptability of industrial types to the specialized need in an engineering department. The columns are plastered and painted with special green conforming to the walls, and the monitor has been completely inclosed by a band of glass block, with heat-intercepting block on the south and west sides.

Bus ducts have been installed throughout the 50-ft. monitor bays which constitute the principal area in the recently completed addition to Bell Aircraft plant, of which a typical section is shown here. Unit heaters installed below the roof in the low monitor section are of the blower type and can be adjusted to handle all outside air or to mix fresh air and recirculated air in any proportion. They are operated by automatic controls

Special ventilating hoods, installed over the work tables in the Plexiglas department on the north mezzanine, remove fumes given off by the plastic cement with which women have to work



Fluorescent lighting is installed throughout the engineering building, with continuous fixtures providing 50 foot-candles in the drafting room and individual units providing 35 foot-candles in the first-floor offices. All offices have acoustic plaster ceilings and green metal partitions which conform to color specifications applied throughout the plant. The color used on walls in this building is a "cool green," somewhat on the yellow side to relieve eyestrain. Floors in this section, as well as in the east mezzanine where the same green has been used, are red and brown asphalt tile, selected for easy maintenance and because the color combination is relaxing.

Color experts specified a light terra cotta, at the opposite end of the color prism, for use on three walls in the cafeteria, believing that the complete change experienced in going from green offices to cafeteria would give employees much-needed mental and physical relief. Cream-colored ceramic tile on the fourth wall behind the serving tables blends perfectly in both shade and sheen with the painted wall above it.

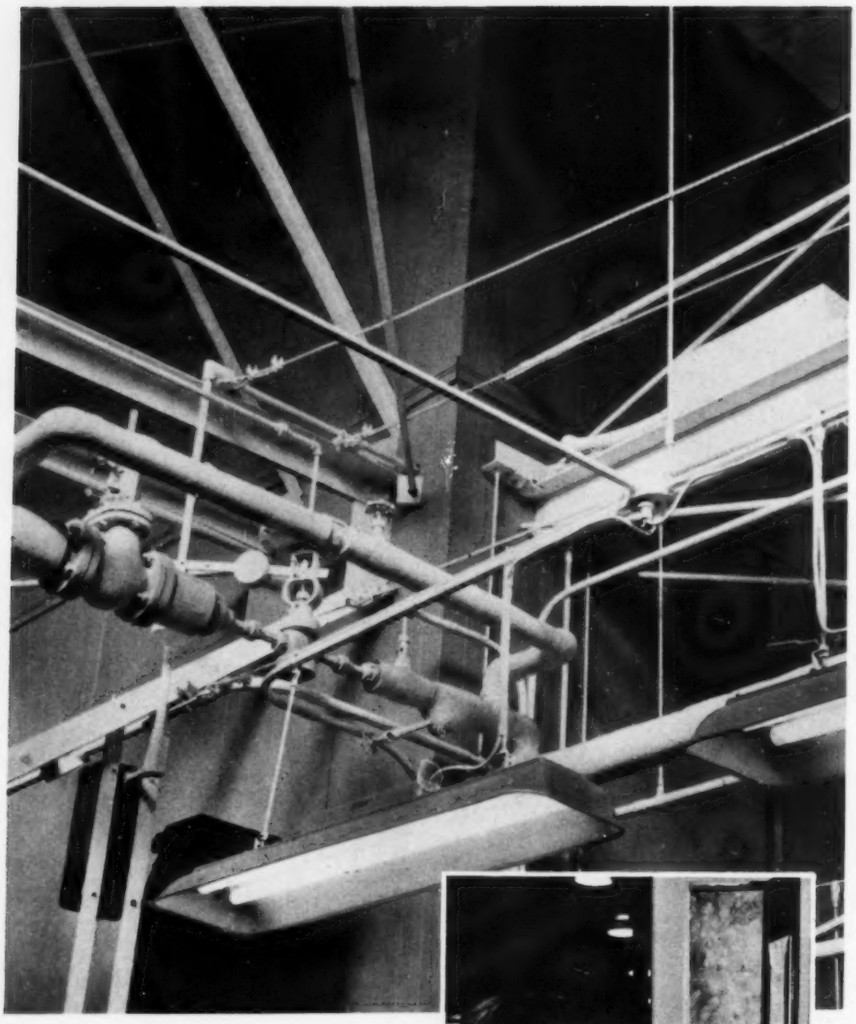
The cafeteria has been designed to accommodate groups up to 500 for motion pictures, which can be thrown upon a special screen from the same projection room installed for small, executive showings. This has been accomplished by locating the projection room in an angle between the cafeteria and the small viewing room.

Employee Facilities

Bell has concentrated two lunchrooms, kitchen, locker rooms, toilets, and employees' store along an 18-ft. corridor, which has light buff tile walls from floor to ceiling.

Most factory employees enter the plant through this special corridor. After depositing their coats, hats, and other belongings in steel lockers, they proceed to working locations via stairways at intervals along the central corridor. Lighting units recessed in the white-painted corridor ceiling maintain a maximum of headroom and add to the effect of spaciousness provided by the use of cream-colored tile on the walls.

Everything in the plant proper



Piping, conduit, and even the messenger cable which supports the fluorescent lighting units have been painted white to minimize consciousness of these various facilities from below

Lighting control panels of the multi-breaker type, recessed between column flanges, are supplemented by photo-electric cells which provide automatic regulation of plant lighting

above a steel gray dado has been spray-painted with a single coat of eggshell white. This minimizes consciousness of unit heaters, conveyors, pipe, etc., and has the general effect of raising the level of illumination throughout the plant.

Lighting is of several types, with an alternating arrangement of 400-watt mercury and 1000-watt filament lamps in prismatic glass reflectors in the new portion of the main assembly bay, which has the benefit of monitor lighting by day. This provides a minimum of 40 foot-candles. Five-hundred-watt filament lamps with prismatic reflectors have been used beneath the south mezzanine and on and below the north mezzanines, with the same result. Two 40-watt fluorescent lamps are used in porcelain-enameled reflectors on the south mezzanine, and rectified fluorescent is still used in the high bay.

Lighting controls centered in panels of the multi-breaker type have been supplemented by photo-electric cells mounted at several locations indoors above the manufacturing area and on top of the engineering building's monitor roof. These cells activate a main contactor in the lighting panels and turn on the lights when daylight falls below a given level. The plant has an emergency lighting system served by a 175-kw. gasoline-driven generator.

Fire-signal, air-raid-alarm, sprinkler-supervisory, and compulsory watchman's tour-key systems are all electrically connected to a central control desk. Automatic highway-traffic signals installed at the main gate and at the employment building gate have directional detectors as well as manual pushbutton controls.

Heating systems throughout the plant, with the exception of the office building, consist of 100-lb.-per-sq.-in. steam supply system, unit heaters, convectors, traps, condensate pumps, etc. Many of the unit heaters are arranged so that they can handle outside air or recirculate air from the building.

Timber Building

The integrated layout includes a large production hangar of timber construction, with overhead doors inclosing two sides. This hangar is equipped with monorail facilities and has a large open paint-spray floor located above an open steel grille which exhausts 160,000 cubic feet of air per minute.

Another hangar building with unobstructed area 200 feet square adjoins the shipping building where planes are taken apart after testing, and crated for shipment abroad. This structure has an interconnecting network of overhead monorail cranes which expedite the handling of propellers, fuselages, and wing sections, as well as lumber and crates.

The employment building has a large waiting room, with reception counter separating the two sections reserved for men and for women. The reception counter, directly opposite the entrance, serves as a control point from which applicants are dispatched to the interviewing rooms, from which they are routed through medical examination, X-ray room, and finally through the photographic and fingerprinting routine.

The factory parking area is accessible from two highways and is located at one end of the plant, adjacent to the headhouse, and to the employment office, which has a separate fenced-in parking area for applicants. Office parking is provided at one end of the office building and visitors' parking at the other.

View across roof of Westinghouse "egg-shell" plant shows a few of the 33 ventilators

WESTINGHOUSE

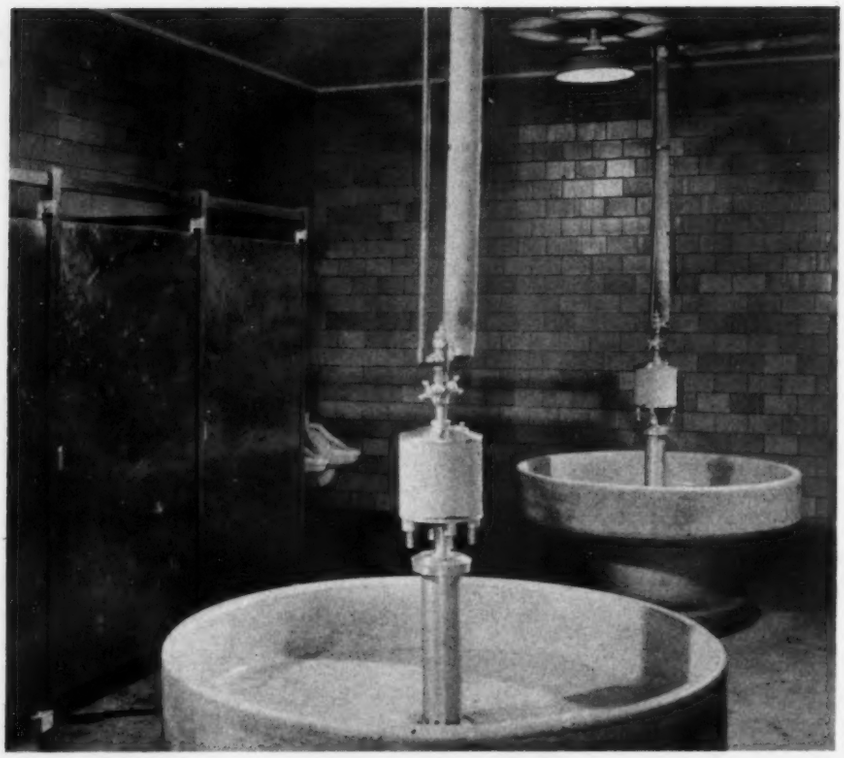
Architect and Builder: Westinghouse Construction Department. Roof design: Roberts & Schaefer Company, Chicago

SEARCH FOR THE FASTEST METHOD of construction led Westinghouse Electric & Manufacturing Company to adopt the "egg-shell" design for an addition to its transformer tank plant. The result was a saving of four months over estimated construction time for other types of buildings.

Built with a minimum of critical materials, the 1100-ft.-long tank shop houses more than 160,000 square feet of manufacturing space, enough to permit employment of nearly 400 additional workmen. It provides a special building for all structural work on transformers. It is the largest industrial building of its type in the world, and is the first in this country to be used for anything but hangars, warehouses, and skating rinks.

The structural frame design provides for three crane aisles, approximately 40, 50, and 60 feet wide, with column bays spaced on 25-ft. centers. Reinforced concrete columns are 3x2 feet in sections cast integrally with footings. Columns have knees cast to side for support of reinforced concrete crane girder, and continue up for support of girder forming edge member of arched concrete roof shell.

Each shell is cast to a radius of 45 feet and, as it has cantilever action, varies in thickness from 3¾ to 6½ feet. Each 100-ft. section is an independent self-sustaining unit consisting



One of the four washrooms for men. All four have inclosed toilet stalls and wash fountains. The women's washroom is equipped with individual wash basins instead of wash fountains. Walls are tiled. Floors are concrete

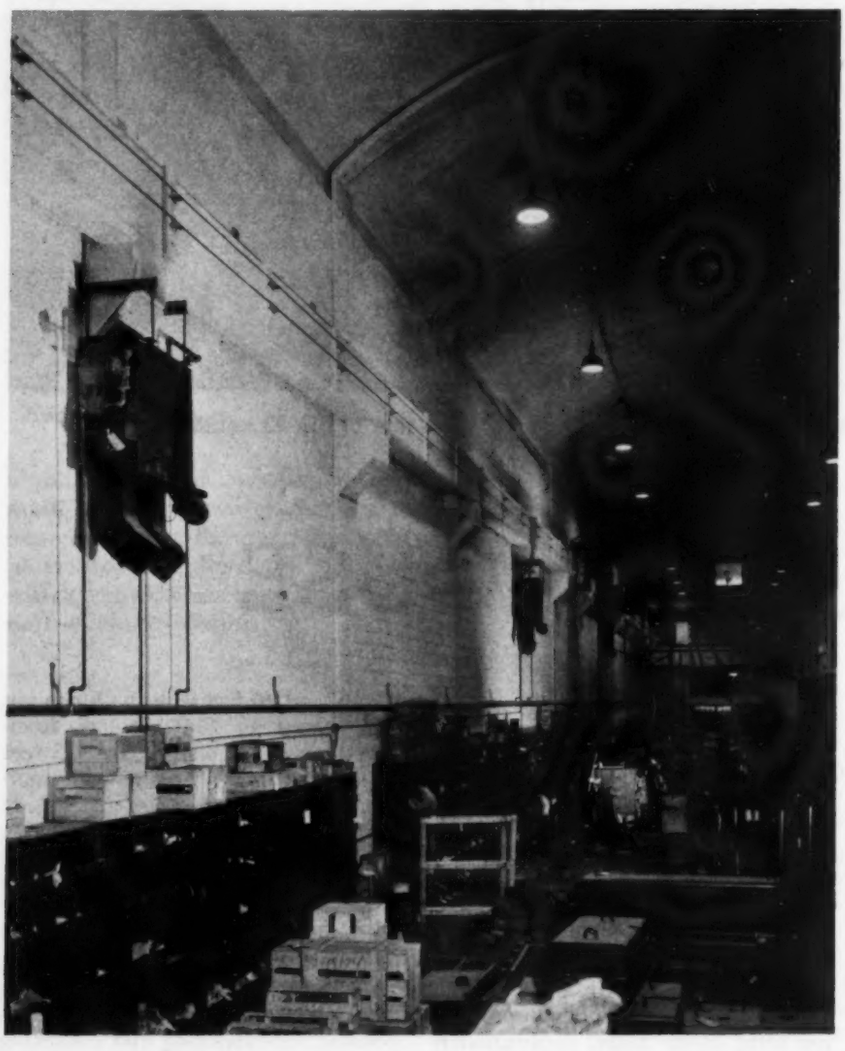
of four bays and is separated from the next section by an expansion joint. Reinforcing frames were provided across the top of the roof shell. This arrangement provided for an arched ceiling free from all obstructing ribs and permitted the use of movable forms.

The arched shell roof and crane girders in places where they parallel existing buildings are supported by steel brackets attached to structural steel columns in the outside walls of those buildings.

For Temporary Support

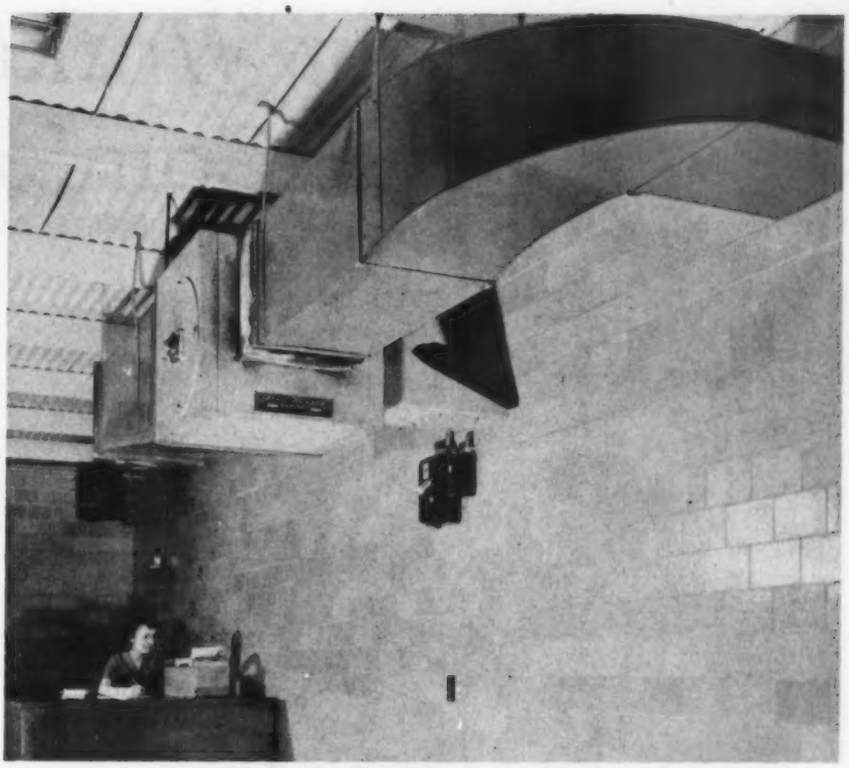
Usual wood forms were used for column and beams. A feature of casting crane girders was the use of steel beams as temporary support from column-to-column form. As the roof-casting plan required the use of a crane girder for support of the roof-arch form, crane girders were cast early so they would have time to develop strength before loads were imposed. The crane rail was then placed and secured to hold rollers supporting wood trusses framed to support the roof-shell form.

Two complete sets of roof forms were provided for each aisle. Each set was 100 feet long to complete one of the 100-ft. units of the building. Each form unit consisted of 15 wood arches with arched top chord, supporting 3x8-ft. roof rafters, over which ⅝-in. plywood was nailed. The timber trusses were supported on carriages with flanged wheels traveling on rails. During casting, arches were set at 100-ft. intervals, permitting forms to be



Unit heaters rated at 163,000 B.t.u.'s per hour are spaced 75 feet apart in the stock bay. They are of the blower fan type with separate motor and belt drive. The units draw in fresh air and mix it with recirculating room air. Furthermore, it is likely to suffer less from bombing or sabotage, since an explosion would cause only local damage, which could be easily controlled and repaired

Toilet and locker rooms and adjacent areas are well ventilated. This unit provides 100 percent outside air. Experience has proved that this type of building is much cooler in summer than conventional structures with skylights



moved forward in sequence and providing for proper setting time of concrete. Each cycle of relocation was seven days.

Concrete used was a mix of local sand and gravel with high early-strength cement. Concrete for column footings was designed to provide 2500 pounds per square inch, and for girders 3000 pounds per square inch. The roof shell was poured with high early-strength concrete to provide 2500 pounds per square inch at the end of seven days, to permit the scheduled pouring cycle.

Reinforcing of roof shell consisted of ½- and ⅜-in. steel bars which easily followed the arch curvature without bending. Column and girder reinforcing was typical. Only 1100 tons of reinforcing steel bars were used, compared with about 3500 tons of steel required in conventional buildings of equal size.

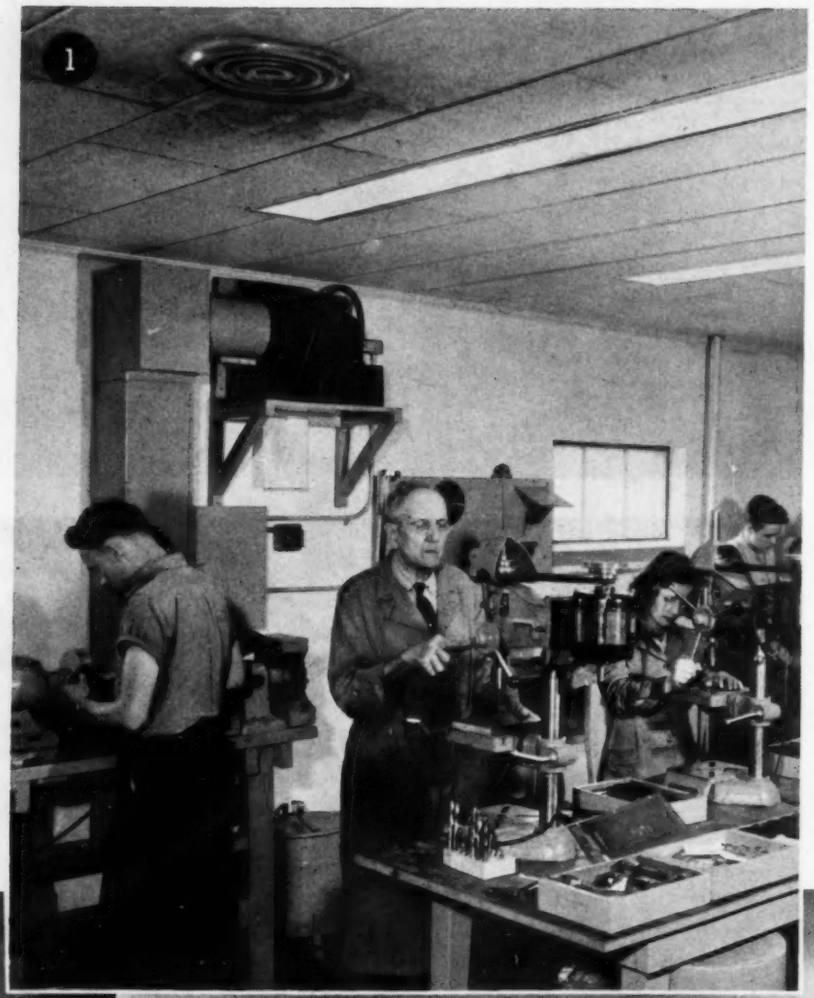
To Resist Fire

This type of building is likely to suffer less from bombing or sabotage, as an explosion would cause only local damage which could be easily controlled and repaired. It is designed to resist internal fire for as long as two hours, whereas a steel and wood building may collapse in 15 minutes.

Experience has shown that the building is much cooler in summer than conventional structures with skylights. The smooth arched ceiling painted white adds to the effectiveness of the lighting and simplifies maintenance of the ceiling.

One of five platform-mounted 300-kva. air-cooled network transformers. These transformers are provided with network protectors on the low voltage side and double-throw disconnect switches on the high-voltage side. Shown in this photograph are the knees that were cast on the sides of columns to support the reinforced concrete girder on which the crane rail was laid

Features for Worker Health and Comfort



AIR CONDITIONING

1. Temperature and humidity are controlled at new Telex Products plant in Minneapolis

LOUNGE

2. Employees eat lunch, have parties, and relax in off moments in the lounge provided by G. D. Searle & Co., Skokie, Ill.

LOCKERS

3. Air is circulated in base of lockers in Caterpillar's new heat-treating building, to prevent dampness and odor from workers' clothes

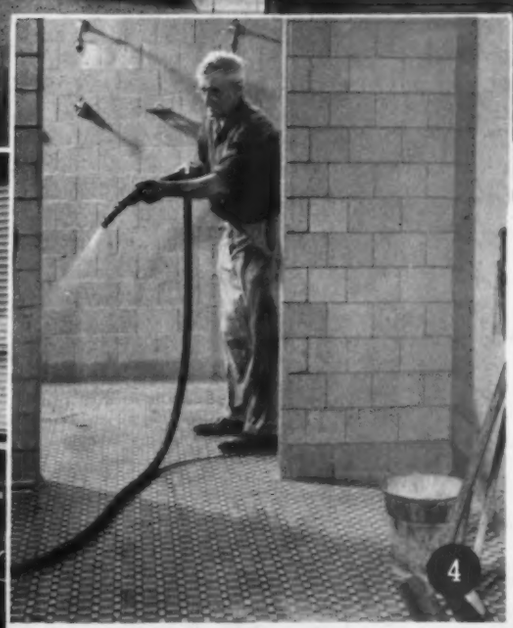
SHOWERS

4. A thorough scrubbing every day is the rule at Caterpillar

FIRST AID

5. Venetian blinds add right touch at Mechanical Handling Systems, Inc., Chicago

6. Emergency stations are located at intervals along mezzanine at Bell Aircraft's new plant



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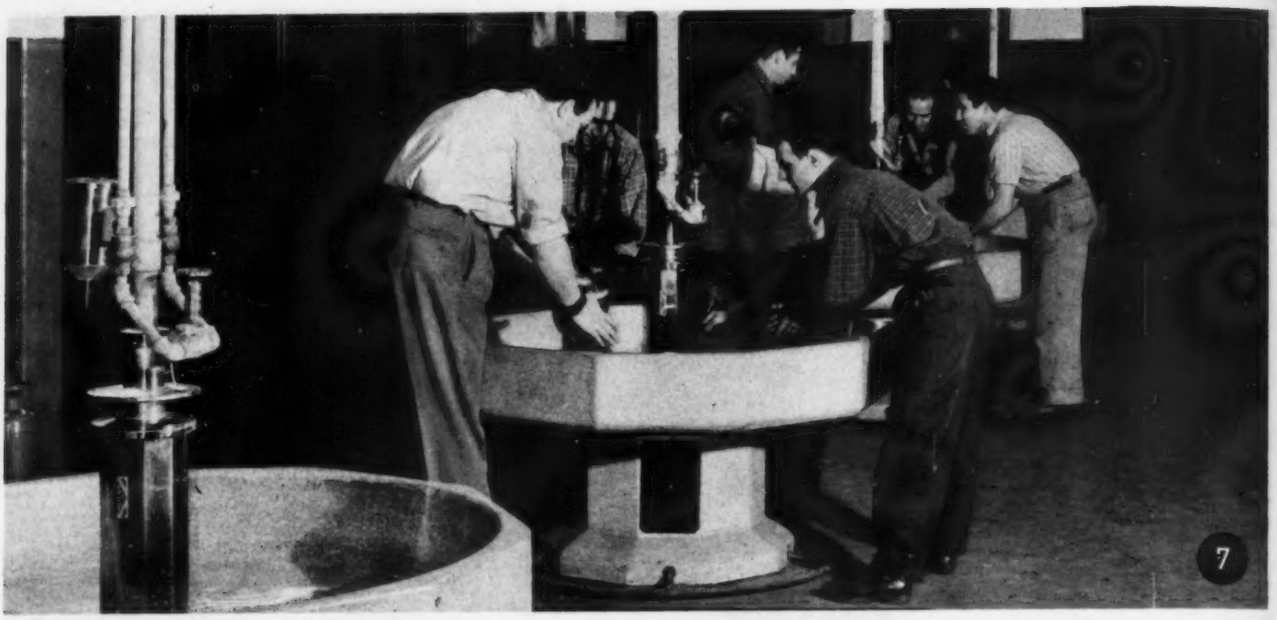
FEATURES FOR WORKER HEALTH (continued)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8

9

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WASHROOM

7. Plenty of hot water at Walter Kidde's assembly plant

CAFETERIAS

8. Balanced meals are served at new plant built by Adel Precision Products Corporation

9. Cream-color ceramic tile has been used on sidewalls, quarry tile on floor, of kitchen that serves Bell Aircraft cafeteria

10. From 180 to 200 people can eat at a time at RCA Laboratories

VENTILATION

11. Special hoods at Boeing's Wichita plant remove all vapors from anodizing tanks direct to outside atmosphere

LIGHTING

12. Fluorescent units supplement natural light let in through saw-tooth type of roof in the Adel drafting department

Keeping Plant Buildings in Condition

ONLY TWO THINGS are needed to keep buildings in condition: (1) Inspection; (2) complete maintenance.

But there is a catch! These two things must be continually repeated – or, better, continuously repeated.

How long has it been since your buildings have been inspected – 30 days, 30 weeks, 30 months, or 30 years? And how long since the defects have been repaired? If it is 30 days or even 30 weeks, you may take a bow and pat yourself on the back. If 30 months, that's bad, and you had better start an inspection and repair program now. But if it's 30 years, or even 5 years, you really have a headache. The procedure outlined herewith will help, but it is going to cost a substantial amount of money, perhaps as much as ten times the cost for normal maintenance.

Monsanto routine includes inspection to determine action of chemicals on wood

What to Do

The plant that makes frequent and detailed inspections of its buildings has well-qualified inspectors on the maintenance department payroll in normal times. But these are not normal times. New and inexperienced men may have been taken on. So procedures are discussed here in considerable detail to provide specific instructions to the new man and to serve as a guide to the more experienced.

For those companies that have not inspected their buildings for several years and have not the necessary qualified men to make detailed inspection, two courses are open. The more satisfactory course is to find and employ a high-grade inspector. This man should be carried on full-time payroll and should lay out a convenient inspection schedule. The company should see to it that the schedule is strictly followed. The other alternative is the employment of an architect, general building contractor, or building inspector to make annual inspections of all buildings. To enhance the value of all building inspections, report forms should list the details needing examination. The forms should be as complete as possible for general application.

The inspector indicates the defects needing attention and gives detailed locations of the faults. Incipient defects are noted and examined on succeeding inspections. A copy of the inspection report is turned over to the proper maintenance supervisor, and the work indicated is promptly performed. Deferring maintenance can be costly and hazardous. The sooner defects are corrected, the lower the cost.

When the building inspector finds damage, other than that caused by normal depreciation, he attempts to locate the cause. It is imperative that the cause be removed or corrected.

When the cause of the damage cannot be removed or corrected, changes must be made to lessen the effect. Such a change might be the addition of steel plates on a wood floor at a point where heavy industrial trucks change direction.

It is difficult always to differentiate between inspection and maintenance. Building inspection is a maintenance function, and the inspector should know the fundamentals of repairs. The maintenance men, by the same token, must know what the inspector is looking for, and what means can be used to keep the building in condition. In some plants the inspector is also the maintenance foreman. Of course, repairs must now be made with non-critical materials when such materials are suitable. Maintenance activities are limited by the War Production Board to required maintenance. The use of materials is severely restricted, and many materials are difficult to obtain. The maintenance department will thus find many ways of making repairs where formerly it made replacements. Building repairs are more numerous and more important now than ever before. Production must be kept up to schedule, wear and tear are more severe, materials are scarce, and labor is even scarcer.

Because maintenance normally follows inspection, this article will point out many of the parts of buildings that require inspection and maintenance, mention the faults to be expected, and discuss briefly some of the means of repair.

Start With Walls

A building inspection starts at the top or the bottom and continues systematically throughout the building.

Starting on the inside, the foundation walls are examined for any indication of failure or weakness. Joints between floors and walls, in the walls themselves, or between

(*Continued on page B-92*)

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Sulphuric acid is important in the manufacture of explosives, but absolute purity of the acid is essential. Buell Dust Recovery Systems are used in conjunction with the contact method of making sulphuric acid because their high efficiency in removing contaminating flue dust from the sulphur dioxide gas assures purity in the finished product.

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and other industries for the elimination of hazardous dust nuisances and the recovery of critical materials.

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

Keeping Buildings in Condition

(*Continued from page* B-90)

parts of buildings need to be constantly inspected for cracks and leaks. These cracks are usually movement lines and must be sealed with an elastic calking material. Sealing movement cracks with rigid material may shift the movement stress to other points and cause additional cracking. However, subgrade cracks can usually be satisfactorily filled with a rigid substance, since subgrade areas are not subject to extreme temperature changes.

Walls should be dry and not pitted. All leaks must be repaired and sealed. Damp walls can be waterproofed by accepted methods. Leaks through basement walls are frequently supplied by water not properly drained from the outside. Include drainage facilities for groundwater in the outside inspection.

Columns and Girders

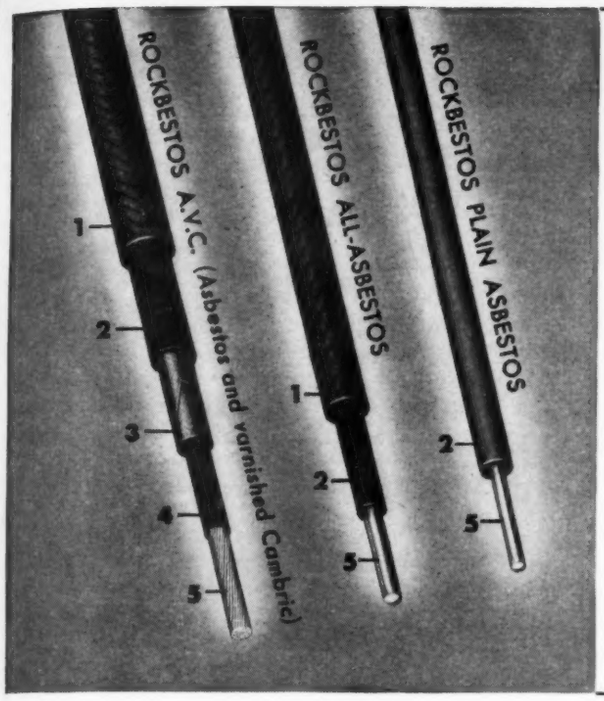
Examine the bases of all columns; the bases are the normally weak spots. Steel may rust, concrete spall, and wood dry rot at the lower end and be sound over the remaining length.

When steel rusts, it is brushed clean, primed, and painted. The spalling of concrete can be retarded by cleaning off the loose material and recoating after wetting the spalled areas. If water has been the cause of the trouble, remove the source or apply waterproofing to concrete. Examine wood columns carefully for dry rot and other failures. Where dry rot occurs, replace or reinforce the members. Splits and checks may be normal or may indicate overstrain.

Inspect all beams, columns, and girders for weaknesses caused by overloading. Such overloads may have occurred in the rush of war production. Sagging, cracking, and spalling of beams and girders may indicate that overloading does occur. Whenever overloading is found, shift the load or place additional supports under the overstressed members. As the building inspection progresses upward, these points must be carefully watched and checked.

Floors

Before leaving the basement, examine the floor for cracks, holes, gouges, and drainage. Pay particular attention to traffic lanes on all floors, especially where trucks change direc-



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Rockbestos Permanent Insulation Insures Long-Lived Performance

1. A tough, rugged asbestos braid, resistant to heat, flame, moisture, oil, grease and corrosive fumes.
2. Felted asbestos insulation impregnated with heat-, flame-, and moisture-resisting compounds will not dry out, become hard and brittle, or burn. Also serves as a heat-barrier against high ambient temperatures.
3. Lubricated varnished cambric for high-dielectric strength and added moisture resistance, protected from heat, flame, and oxidation by felted asbestos walls.
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600 VOLT A.V.C. SWITCHBOARD WIRE—TABLE B
(Underwriters' Type AVB)

Sizes No. 18 to 4/0 A. W. G. with varnished cambric and felted asbestos insulation and gray, black, white or colored flameproof cotton braid.

Combine fire insurance and fine appearance in your switchboards with Rockbestos Switchboard Wire. It is absolutely fireproof and will not dry out under heat. Sharp, clean bends can be made without cracking as the asbestos wall acts as a cushion under the braid. Rockbestos A. V. C. Hinge Cable and Switchboard Bus Cable have the same fireproof and heatproof characteristics.

INDUSTRIAL HEATING CABLE—TABLE LH

No. 19 A. W. G. nickel-chromium wire insulated with .040" of felted asbestos and covered with 4/64" waterproof lead sheath.

This pliable cable distributes a mild heat evenly over a large area. Prevents freezing of water pipes, wet pipe sprinkler systems, etc. Keeps conveyor pipes for fuel oil, soap, varnish, ink, chocolate, etc., at temperatures that insure steady flow.

ASBESTOS INSULATED MAGNET WIRE

Round, square and rectangular asbestos insulated conductors finished to meet varying winding conditions and coil treatment requirements.

Protect your motors against heat-induced breakdowns with class B windings of Rockbestos Heat-Resisting Magnet Wire. Leads of A. V. C. Motor Lead Cable will complete the failure-proofing.

ALL-ASBESTOS FLEXIBLE CORD—TABLE CA

Sizes No. 10 to 18 A. W. G. with two or three conductors insulated with felted asbestos, covered with asbestos braid. Also in A. V. C. (asbestos and varnished cambric) constructions.

This heat-resisting flexible cord is ideal for high-wattage lighting units, floodlights, blueprint machines, apparatus, etc., which require a heavy duty, enduring cord. For moisture-resistant construction specify the A. V. C. type. Labeled cord with polarized conductors if desired.

600 VOLT A.V.C. BOILER ROOM WIRE—TABLE C
(Underwriters' Type AVA)

Sizes No. 18 to 4/0 A. W. G. This construction for sizes 18 to 8, sizes 6 to 4/0 have another wall of felted asbestos next to the conductor.

For lighting and control circuits exposed to heat and moisture, oil, grease, corrosive fumes or fire hazard, such as exist around furnaces, ovens, lehrs, soaking pits, boilers, etc., this widely used A. V. C. construction is ideal. Also for locomotive panel wiring and for switchboards requiring an asbestos braided wire.

THERMOSTAT CONTROL WIRE—TABLE TC

Sizes No. 14, 16 and 18 A. W. G. in two to six conductors with 12½, 25 or 31 mil wall of felted asbestos insulation and cadmium plated steel armor.

A multi-conductor control wire for low voltage intercommunicating, signal and temperature control systems. Its lifetime insulation and rugged steel armor will give you trouble-proof circuits.

600 VOLT ALL-ASBESTOS RHEOSTAT CABLE—TABLE R
(Underwriters' Type AI)

Sizes No. 18 A. W. G. to 1,000,000 CM insulated with a heavy wall of felted asbestos, covered with a rugged asbestos braid finished in black, white or colors.

Use this power and rheostat cable for wiring rheostats, switchboards, elevator and locomotive control panels and electrical equipment exposed to heat, fumes and fire hazard. Also for general open wiring in dry, high temperature locations. For solid conductor specify Rockbestos Rheostat Wire, Table A.

600 VOLT A.V.C. MOTOR LEAD CABLE—TABLE L
(Underwriters' Type AVA)

Sizes No. 18 A. W. G. to 1,000,000 CM insulated with two walls of felted asbestos and a high-dielectric, heat-sealed varnished cambric insert, covered with heavy asbestos braid.

Heatproof, fireproof, greaseproof and oilproof, will not dry out and crack, won't burn or carry flame, and remains permanently flexible. For coil connections, motor and transformer leads where extreme heat and fire hazards are encountered as in steel mills, etc.

600 VOLT A.V.C. CONTROL CABLE

In one to 19 conductors. Standard stranding A. W. G. No. 12—19/No. 25 and No. 9—19/No. 22. Other strandings furnished.

Designed for use under conditions too severe for control cables with other types of insulation which deteriorate rapidly when exposed to high temperatures. Operates without failure under the attack of heat, oil, grease or corrosive fumes and may be installed in conduit as it has ample moisture resistance.

600 VOLT A.V.C. POWER CABLE—TABLE E
(Underwriters' Type AVA)

Sizes No. 18 A. W. G. to 1,000,000 CM insulated with laminated felted asbestos, varnished cambric, and asbestos braid. Other constructions for service voltages to 8000.

Recommended for power circuits and hot spot wiring in or around boiler rooms, steam tunnels, soaking pits, tenter frames, glass plants, etc. The asbestos and heat-sealed varnished cambric construction has ample moisture resistance and withstands high temperatures.

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the new manpower / production requirement

Vital to accident-rate reduction

Glaring or insufficient light that makes seeing difficult is one of the principal reasons for lost-time accidents. *Re-lighting* your plant will help you save many of these man-hours of production, particularly on your night shifts.

Most plants operating today were designed and built for peacetime, daylight working schedules. *Lighting based on daylight conditions is inadequate to serve the needs of night workers.*

Re-lighting does not mean discarding your present lighting system. It merely means increasing the efficiency of your present equipment by re-locating lamps to eliminate glare and shadow, increasing lamp wattages where necessary, or installing additional equipment to insure uniform lighting levels. A Silv-A-King lighting engineer can tell you exactly what you need and how little re-lighting will cost.

Silv-A-King has specialized in industrial lighting for 22 years. Silv-A-King quality equipment (fluorescent or incandescent) plus a Silv-A-King "engineered layout" makes an unbeatable combination.

BRIGHT LIGHT REFLECTOR COMPANY, INC.
1027 Metropolitan Avenue, Brooklyn, N.Y.

Send for your copy of our 16-page book: "Light Is An Essential Production Tool"

SILV-A-KING MAKES *Light* WORK FOR YOU

tion of travel. A break in concrete under heavy traffic rapidly becomes larger and should be repaired promptly. There are many patching compounds and methods which, if properly applied, make a satisfactory repair. Some of these compounds may be placed and used immediately under heavy traffic. It is necessary to clean out the hole before applying any patch.

Concrete patches tend to crack out rapidly, and as a rule need frequent replacing. The so-called plastic patches last much longer, and are easier to place. Where the floor is of asphalt or similar composition, the repair is made with the same material or with patching compounds. Heat is needed with some materials to assure a good job of patching.

Wood floors with badly worn spots may require replacement of worn boards, or the boards may be removed and the opening filled with the plastic materials mentioned above. Loose boards should always be renailed. Wood block floors may be repaired by using new blocks, resetting old ones, or filling in holes with plastic material.

Damage to floors is frequently caused by heavy industrial trucking. It is sometimes necessary to place steel plates over locations where trucks change direction or where traffic is excessive.

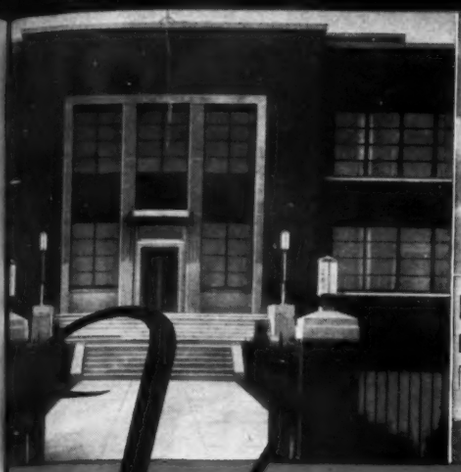
Stairs and Aisles

Aisleways, stairs, and lanes where pedestrian traffic is heavy should be watched for irregularities that might cause falls. Such irregularities must be promptly leveled off. Repair or replace badly worn stair treads. Slip-proof treads must be really slip-proof; inspect each tread to determine the effectiveness of the slip-proof material. Be sure that railings are tight; a loose railing may cause a serious fall.

Many stairways are being heavily used and are overcrowded at times. For this reason they need more than the usual inspection and maintenance. Where stairs are on wood stringers, examine the stringers and reinforce them at the least sign of weakness or overstrain. Make certain that all fastenings are tight.

Inside Walls

Walls on the inside of buildings do not normally require as detailed inspection as outside walls. However, a thorough inspection includes examination for cracks, defective doors and hardware, and broken glass. Partitions come loose, and need to be



Vital NEW MACHINE TOOL PLANTS PROTECTED BY Carey BUILT-UP ROOFS

At many of the nation's great machine tool plants, as on every other industrial front, CAREY Built-Up Roofs are rendering outstanding service by protecting buildings and equipment vital to the war program—worthy testimony to the DEPENDABILITY of these famous engineered roofs.

CAREY Roofs are individually designed to withstand temperature extremes, salt air, chemical fumes, and other conditions that adversely affect roof life. Normally, these time-tested roofs far outlive their bonded period of service. Make sure of maximum roof VALUE at minimum cost—specify CAREY. A nationwide organization of experienced roofing contractors is at your call. For details, address Dept. 31.

MACHINE TOOLS SET STAGE FOR VICTORY

Upon the machine tool industry was imposed the first tremendous job of equipping the nation for war. The way the industry responded — increasing production from 25,000 machines a year to 360,000—is a shining example of Democracy in action. Thanks to the vital ground work of this basic industry, America has accomplished more in two years than German dictatorship could accomplish in nine.

THE PHILIP CAREY MFG. COMPANY

Dependable Products Since 1873

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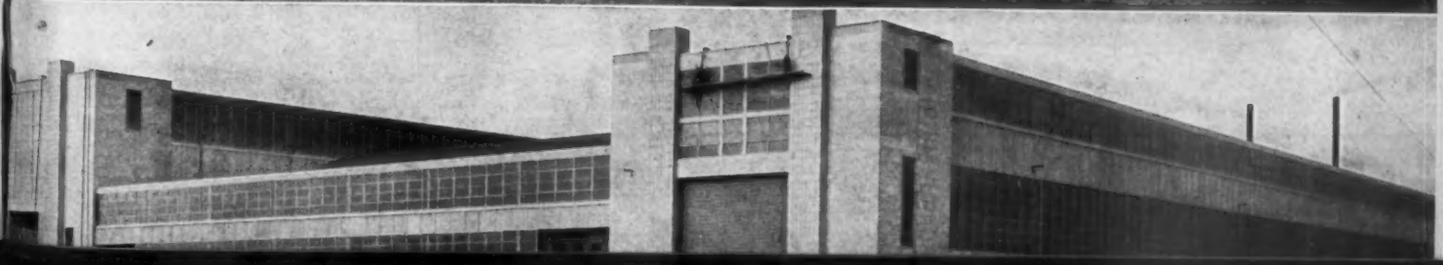
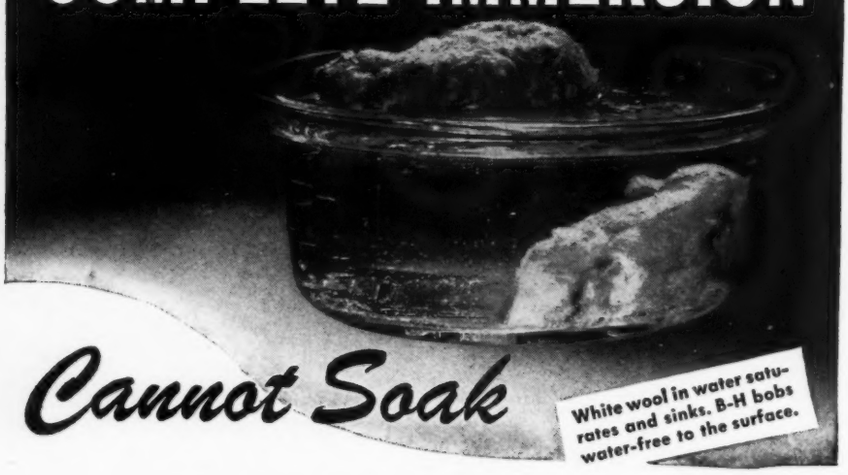


COMPLETE IMMERSION



Cannot Soak

White wool in water saturates and sinks. B-H bobs water-free to the surface.

BALDWIN-HILL
BLACK ROCK-WOOL INSULATIONS

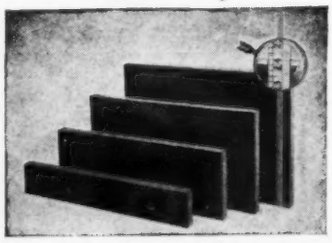
MOISTURE does not disintegrate this utterly different form of rock wool. It does not make it settle. It can't ruin its insulating value. By actual test, B-H black rock-wool absorbs less than 1% of its weight in moisture after being immersed completely.

That is one reason for specifying B-H black rock-wool. Another—equally important—is its stability under heat and vibration. 1400° of flame, which cut their way right through ordinary white rock-wools, leave B-H unharmed. Remember these facts and investigate B-H black rock-wools, felts, blocks and cements.

B-H

FREE TO EXECUTIVES

A generous sample square of Baldwin-Hill Mono-Block, the one block for all temperatures up to 1600°, together with a sample of B-H Bond-Tite, the easy adhesive which makes wiring unnecessary. Test for yourself the heat-resistance, the extraordinarily low conductivity, the quick adhesion, and ease of cutting of this universal insulation. Just write us on your letterhead.



BALDWIN-HILL *Insulations*

545 KLAGG AVE. TRENTON, N. J.

NEW YORK CHICAGO KALAMAZOO

more firmly supported or fastened. Continued growth of cracks on inside walls is something to be thoroughly investigated. It may indicate ordinary shrinkage or settling, or it may mean more serious settlement of footings. Overloading or failure of some structural part may actually be under way.

The cause of these cracks must be determined. If due to overloading, remedy the condition before the situation becomes critical. If due to structural weaknesses, immediate repairs are required.

Moisture stains on the inside of outside walls usually indicate cracks extending through the walls, poor calking around windows, or loose or broken windows. Locate the origin of water stains, and eliminate the cause. It is a good plan to list all stains of this nature on the inspection report. Such notes will aid in finding cracks and leaks during the outside inspection.

Of course, the inside of all windows, doors, and other openings are inspected during the trip through the building.

Moisture spots on the ceiling and walls immediately below the roof indicate leaks in the roof. Identifying the location of these spots will aid in the roof inspection.

Roofs

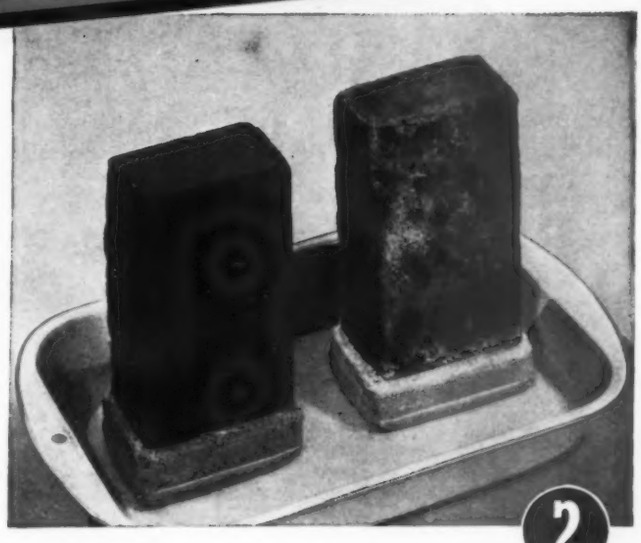
There are many varieties of roofs, and they are parts of the building likely to cause trouble. When a roof is inspected it is important to take time enough to do a thorough job. Leaks through even a small hole may cause cumulative damage to columns, trusses, walls, and other structural parts. The damage may become severe when water accumulations alternately freeze and thaw. This is particularly true where the roof joins the wall.

Examine every inch of roof for possible openings, roof nail holes, bulges or blisters, separation of seams, drying out of paper covering, separation from flashing, cracks, and all other signs of deterioration. Flashings and the area surrounding the flashings are frequently sources of serious roof damage. Be sure that seams between flashing and roof, and between flashing and wall are tight and thoroughly sealed. Examine flashings for pinholes and corrosion. All gutters, ducts, downspouts, and other water-conducting appurtenances should likewise be examined. Examine retaining straps, screws, bolts, nails, and other holding means. It is important to watch for leaks around ventilators, penthouses, and other openings in the roof.

When a roof has been inspected,

MAKE THIS TEST — *Prove* BRIXMENT is BEST!

1 "Cap" one brick with Brixment mortar (left), and one brick with mortar made with 50-50 cement and lime. After mortars have hardened, place both brick in a pan of shallow water. (Photo 1.)



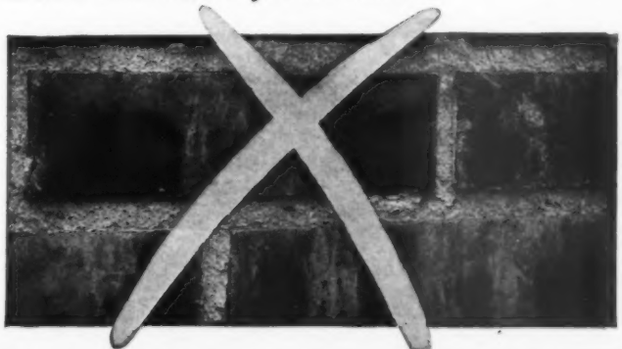
2 Keep about an inch of water in the pan. Even if soluble salts are present in the brick or sand, you will soon be convinced that *Brixment mortar helps prevent efflorescence.* (Photo 2.)

BRIXMENT *Helps Prevent* EFFLORESCENCE!

EFFLORESCENCE is an outcropping of minute white crystals on brickwork. When these crystals occur on colored mortar joints, the condition is sometimes mistaken for *fading.*

Efflorescence is caused by the presence of soluble salts in masonry materials. When reached by water, these salts dissolve, and are drawn by evaporation to the surface of the wall.

Brixment itself *does not cause efflorescence* because it is practically free from soluble salts. Even when such salts are present in the sand or brick, the waterproofing in Brixment mortar usually *prevents them from coming to the surface.* . . . Bricklayers who have used Brixment mortar for years say they have far less efflorescence with Brixment mortar than with *any other kind.*



BRIXMENT

For Mortar and Stucco

Louisville Cement Company, Incorporated, Louisville, Kentucky. Cement Manufacturers for Over a Century.

Surprising

How DEVOPAKE hides and covers any surface *in just one coat!*

SURPRISING it is . . . even to maintenance men and master painters . . . whose experience in painting is broad. Certainly it was surprising — and gratifying — to the school commissioners in a large city (name on request) whose use of Devopake in room painting saved them 35% over former, ordinary methods. **High hiding power** of Devopake saved washing down of walls beforehand. Self-sealing action eliminated an undercoat. **Spreading quality** of Devopake cut gallonage from former 5 gallons per room to 2¼ gallons. **Big-brush workability** quickened time of application . . . **saved** man hours.

Devopake offers this new course in the school of painting experience and stands ready to save you time . . . money . . . labor in making all wall surfaces brighter, lighter, cleaner . . . with just **one** coat — one coat that is a **self-sealing primer and finish coat** in one. Because Devopake is an oil-base paint . . . it will stand up under wear and washing. And it will diffuse and reflect the maximum light available. Devopake by popular demand now comes in **7 practical colors.**

Specify Devopake on your next paint job and enjoy guaranteed satisfaction.

Devoe's maintenance paint line is built to meet all your requirements including high resistance to fungi, fumes and moisture.

Write us today for complete information that can help you solve your maintenance paint problems.

DEVOE & RAYNOLDS CO., INC.

The 189th Year of the Oldest Paint Maker in America

FIRST AVENUE AT 44TH STREET, NEW YORK, N. Y.

take immediate steps to make all needed repairs. Where large roof areas are involved it is not necessary to complete inspection before repair work is started, as the inspectors can always keep ahead of the repair crew. Where small roofs are involved, finish the inspection before repair work is started.

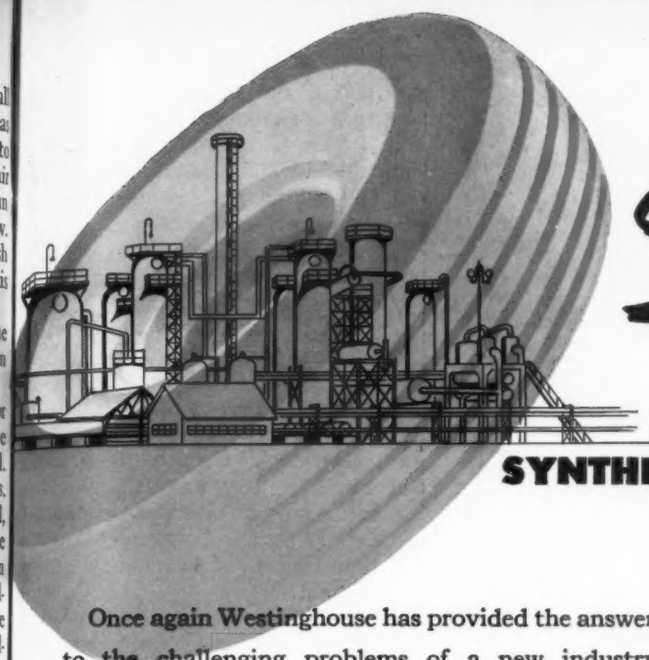
It is a good plan to reinspect the roof after the repair work has been completed.

While inspecting a built-up or rolled roof, see that the seams have not separated, raised, or cracked. Watch for bubbles and dried-out spots. When dried-out spots are remopped, cover all the area included in the original coating. Small leaks are often difficult to find as the water may follow decking for some distance before appearing. Water spotting on the ceiling or puddles on the floor after a rain are usually positive indications of a roof leak. The simplest treatment in such a case is to mop a fairly large area. Usually this will stop all small leaks. Bubbles must be cut, smoothed, and patched. Roofs with skylights, extraneous protuberances—as one maintenance foreman calls wood-frame ventilators—and penthouses, need frequent and detailed inspection. These openings are subject to considerable damage from wind and weather.

Outside Walls

Outside walls from coping to groundline are subject to heavy weathering, and every opening is a possible source of trouble. While inspection of the roof is being made, it is advisable to check the coping stones and parapet walls. Cracks in the coping stones or tiles frequently permit entrance of water into the wall, where freezing may cause serious damage. Loose, broken, or disintegrated coping stones should be reset or replaced.

By using a boatswain's chair or ladders, the inspector is able to examine the walls for shrinkage and settlement cracks; more important, he is in position to check windows, window frames, lintels, sills, ornamental work, and fire escapes. All these parts of the building are subject to weathering and need careful inspection from time to time. When a building is painted on the exterior, this examination reveals the condition of and need for paint. Cracks in outside walls may occur through the normal settling of the building. These cracks can be cut out and sealed with an elastic calking compound to permit continuous motion of the building. Other cracks are due to



Speeding the day

WHEN THERE'LL BE ENOUGH SYNTHETIC RUBBER TIRES FOR EVERYONE

Once again Westinghouse has provided the answers to the challenging problems of a new industry. Control centers, originally developed to meet the need for quickly installed group motor control, are speeding production of the polymerization process vital to manufacture of synthetic rubber.

Because Control Centers are factory grouped and wired, they speed installation, save aisle space, and provide low-cost, safe motor control.

Control Centers can be located away from hazardous points, eliminating the expense of critical-material-consuming, explosion-proof controls. Starters may be mounted on both sides of Westinghouse Control Centers—the units are all of one width and the heights are multiples of the small size. This provides greater space-savings and flexibility to meet varying conditions.

In short . . . Westinghouse Control Centers are the modern control for modern industry. Specify them for your plant . . . write for Booklet 3026 for complete details. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

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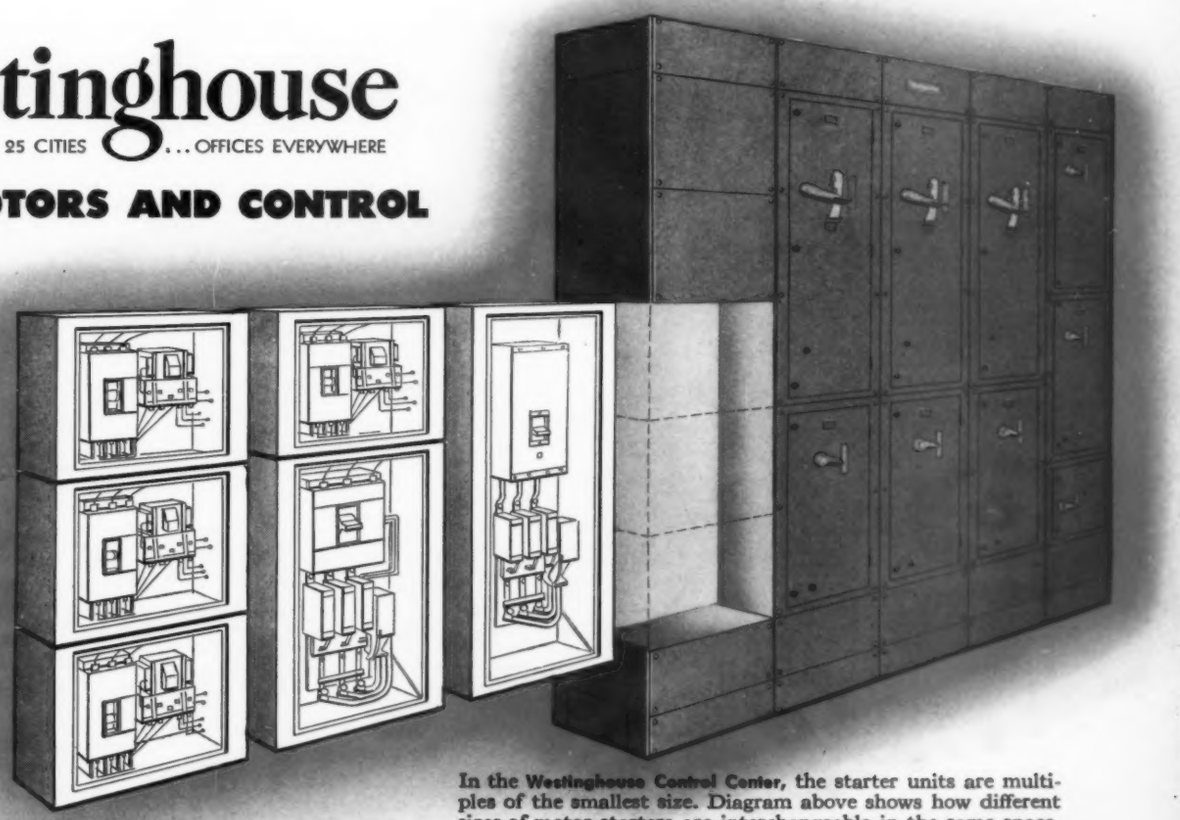
Westinghouse

PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

MOTORS AND CONTROL



In the Westinghouse Control Center, the starter units are multiples of the smallest size. Diagram above shows how different sizes of motor starters are interchangeable in the same space. The unit on the right encloses one Size 4 Linestarter; the two in the middle enclose a Size 1 and a Size 2 or 3 Linestarter; and the units on the left enclose three Size 1 Linestarters.

SLY DUST CONTROL

KEEPS PRODUCTION LANES CLEAN AND CLEAR

★ This installation shows how a Sly filter can be conveniently located between two buildings—out of the way.

The filter, 11 feet long with an 11-foot fan house, is divided into two sections: a 7-foot section to exhaust a Sly 8′ x 12′ blast room, a 4-foot section to serve a tumbling mill and double grinders.

Sly Dust Filters provide exclusive advantages in (1) greater filtering capacity, (2) saving power, (3) easier bag replacement, (4) automatic control, and (5) savings in operation and maintenance.

Whatever your dust problem, write us.

Sly engineers in 15 major cities.

THE W. W. SLY MANUFACTURING CO.

4755 Train Avenue Cleveland, Ohio

SLY
INDUSTRIAL DUST CONTROL

shrinkage and may be sealed by repointing or calking. Cracks often occur at corners of openings or corners of buildings. Cracks near window and door openings can be serious water leakage spots and must be promptly sealed.

Watch joints between walls and columns for cracks. Exposed reinforcing rods may conduct water over long distances. These rods rust and expand, and the water may freeze. Both these actions may cause trouble within the columns or frames. Cover reinforcing steel. Calk exposed ends. Brick walls may need pointing and they may be separated from the columns. All seams between frame and curtain walls must be calked and kept watertight.

Where steel siding is used, the inspector looks at all fastenings, both inside and out, to be sure they are not rusted, loose, or missing. Special attention is paid to joints and seams. Often paint is applied to one side of a seam, and water finds its way in to cause rust.

Glass brick walls need inspection similar to regular brick. Sealing material may become loosened and need repairing and bricks may be broken and need replacing. Check the frames for leaks.

Window and Door Frames

Window and door frames of wood or steel are carefully examined, in the course of a thorough inspection, to assure their tightness. If they are loose, or if there are leaks around them, calk the frames tightly. In some cases it may be necessary to remove the frame, clean out the old calking, and reset the frame. Large frames sometimes become distorted, and the frames are then repaired or replaced, and calked. Tightness of all frames has an additional value in saving heat through the winter months.

Sills, lintels, and ornamental trim should be examined to ascertain water tightness and safety. Remove or repair loose sills and broken lintels or trim.

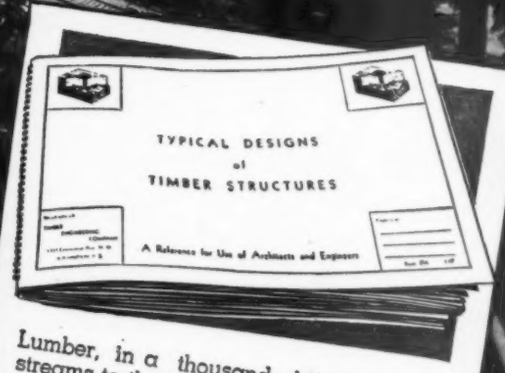
Windows

While inspecting the inside and outside of walls, pay close attention to all windows. When wood sash is used, examine the sash and all structural parts for rot and breakage. Examine steel sash for rusting. Replace broken glass with full panes carefully puttied. Check the condition of all putty. Scrape out and replace loose or broken putty. All forms of sash will remain in better condition over a longer period of time if they are properly glazed and painted. Good paint protects putty and prolongs

FREEDOM IS NOT FREE~IT IS PRICELESS ~ BUY WAR BONDS

SELECTED FOR SERVICE

Topping the "spar tree" preparatory to forestry operations. Selective harvesting of fully matured trees in the surrounding forest will assure continued forest growth.



Lumber, in a thousand different forms, streams to the fighting fronts of the world. At home, wood replaces metal in thousands of heavy duty war structures—made possible by the TECO Connector System of Timber Engineering. This FREE Reference Book shows details of 45 typical timber designs for roof trusses, bridges, towers, tanks, hangars, and other structures for the war today and the peace tomorrow. Available to practicing engineers and architects. *Write* for it today—using your firm letterhead.

The *TECO* Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.

TIMBER ENGINEERING COMPANY

NATIONAL MANUFACTURERS OF ***TECO*** *TIMBER CONNECTORS AND TOOLS*

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WOOD GOES TO WAR — An MGM Technicolor short by James A. Fitzpatrick. Ask your theater when you can see it.

STEEL PRODUCTION GOES UP . . .
when
LAMSON
is on the Job!
It's vital in production of specification steels that hot steel samples get to the laboratory for testing as fast as possible. Lamson Pneumatic Tubes have solved this problem for America's leading mills—rushing these small ingots right from the furnace floor to the laboratory, often a half-mile away. Special Steel Mill Carriers, with their hot samples, weigh up to 10 pounds, yet they travel 20 feet a second!
Lamson Pneumatic Tubes amortize the investment in but a few months. They reduce over-all time of heats—give better control of production—increase tonnage per month—save great amounts of man-hours and messenger service, at a time when every worker counts!
And Lamson Tubes will speed YOUR output too—by rushing anything from blueprints to tools throughout your plant . . . sizes to fit special requirements. Write for Wartime Tube Bulletin FM-4.
Among those now using this Lamson Service: American Rolling Mills—Bethlehem Steel—Babcock-Wilcox—Blaw-Knox—Carnegie-Illinois Steel—Dominion Iron & Steel—Youngstown Sheet and Tube—National Malleable Steel & Casting.
LAMSON CORPORATION
Syracuse, N. Y.
Makers of Conveyors and Pneumatic Dispatch Tubes

the life of both wood and steel sash.

Window hardware, including pulleys, locks, and hinges, commonly causes a lot of trouble. Check condition, and make repairs if necessary. Sash cords and chains are also usual offenders. Tight frames or paint make many windows hard to open or close. The careful inspector tries every window. Good maintenance will make them work.

One inspection job that sounds trivial, and is trivial in many cases, is window cleanliness. When dirty windows are encountered, the inspector notes the fact and sees to it that the windows are washed.

Doors

Doors are subjected to abuse in almost every plant. The hinges and latches become damaged, the doors split or broken, the thresholds ripped away, and closing devices ruined. Careful inspection spots all these flaws, and good maintenance keeps the doors in condition. Be sure they close tightly to prevent entrance of cold air, swing easily and freely, and are not broken. Give special attention to large doors to prevent sagging.

Fire Escapes

Fire escapes, water towers, and all other parts of buildings must be included in the inspection routine. The inspector examines fire escapes for accessibility, safety, functioning of lift sections, and rust. Make certain that faults and defects are promptly repaired.

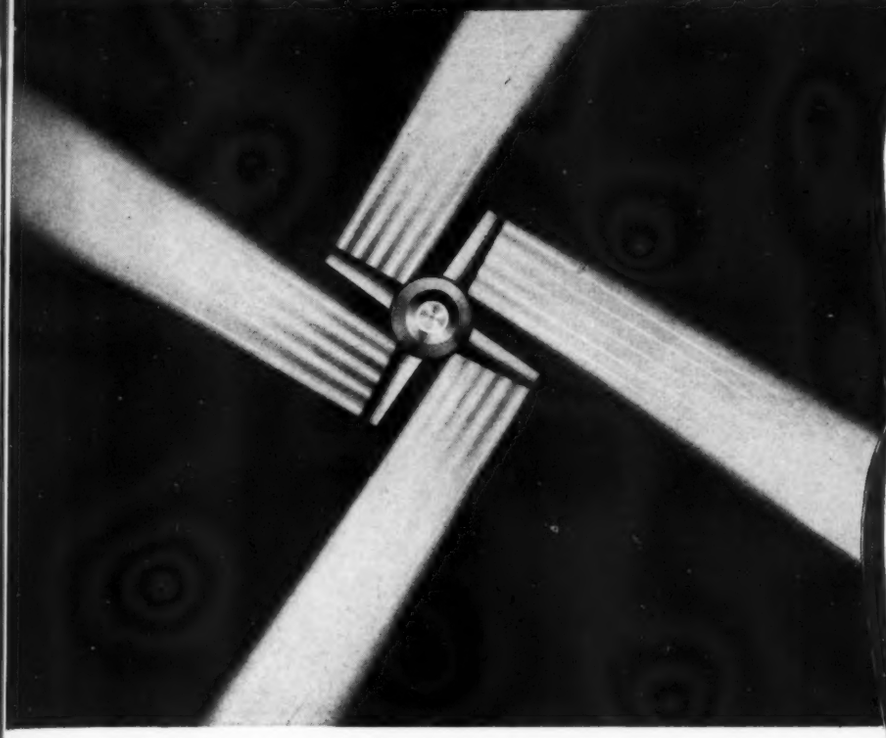
Water towers and their connecting pipe lines need to be inspected for leaks, rust, defective control devices, and damaged valves. Watch the supporting structure for damage from rust, wind, or mechanical failure.

Paint

Paint and painting inspection are important maintenance procedures on all buildings. Keep all wood and metal parts well painted and examine frequently for peeling, chipping, or chalking. Outside surfaces, particularly exposed steel, are important from the paint inspection standpoint. Windows, whether of steel or wood sash, are always a source of trouble, and every corner must be watched to anticipate flaking or wearing away of the paint.

Use high-grade paint on all surfaces. Many companies test paints before they are adopted for use. Some companies standardize on paints, and, when a new one is offered, test it before buying it. It is obvious

A BOOST FOR BUSY BOILERS...



THRU-PUT CAN BE INCREASED BY MORE COMPLETE COMBUSTION — WITH FANMIX

"Pinwheel Action"

Your gas fired boilers are not operating at maximum load possible, if you haven't yet installed the new gas burner that produces a perfectly combustible mixture of air and gas.

With a Coppus-Dennis FANMIX on the job, you get much greater heat release per cubic foot of furnace volume. Gas escaping from radially spaced orifices in the driving arms rotates the fan; causing in-take of air at right angles to the path of the gas.

The energy in gas under pressure is utilized to perform work by mechanically mixing and proportioning the gas with just the proper amount of air, thus eliminating from the furnace the necessity of serving as a mixing chamber as well as combustion space.

Ignition is instantaneous, and combustion is so complete that no flame is visible. A constant temperature exists throughout the furnace — there are no drifting "hot spots". On new equipment, FANMIX saves combustion space, stack height and the cost of forced draft equipment.

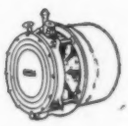
Write for free Booklet 410-3 describing other exclusive fuel-saving, equipment-saving advantages of Coppus-Dennis FANMIX Gas Burners — a Coppus "Blue Ribbon" product.

COPPUS ENGINEERING CORPORATION
204 Park Avenue, Worcester, Mass.

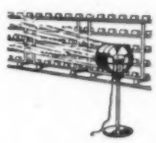
You'll get valuable ideas from these free bulletins on other Coppus Blue Ribbon Products

(Check the ones you want)

☐ Coppus Air Filters. For engines and air compressors. Perfect, uninterrupted filtration. Bulletin F-310-4.



☐ Coppus Type C Turbo Blower. For undergrate draft. Bulletin 145-6.



☐ Coppus Heat Killers. High speed blasts for cooling and drying furnaces, motors, generators, products, etc. Bulletin 160-5.

☐ Coppus Steam Turbines. 6 sizes (and prices) from 150 H.P. down to fractional. Bulletin 135-9.

☐ Coppus Cable Manhole and Tank Ventilators. For confined working spaces. Bulletin 163-1.

☐ Coppus-Dennis Fanmix Gas Burner (described in this ad).

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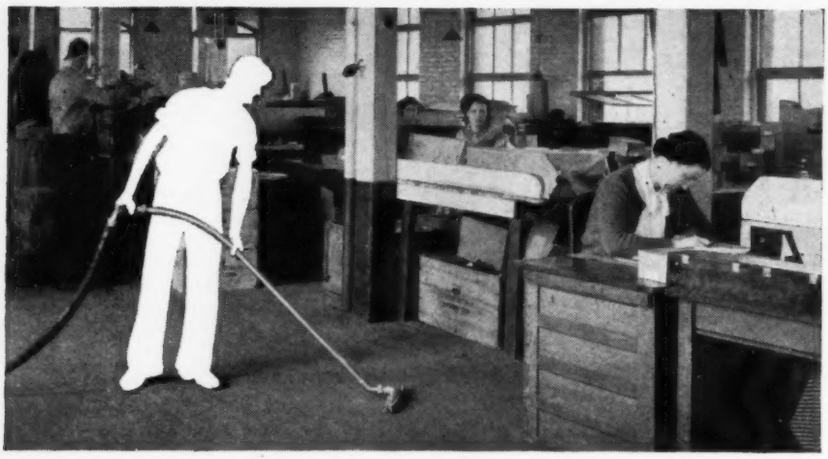
COPPUS

COPPUS BLUE RIBBON PRODUCTS DESIGNED FOR YOUR INDUSTRY . . . ENGINEERED FOR YOU



ENLISTED?

Some of the men who cleaned your office or plant have probably gone by now. But those plants having Spencer Vacuum Cleaning now use inexperienced men or women and continue the necessary standards of cleanliness at all times.

With mass production and its resulting dust and debris, cleaning is more necessary than ever—to clear the way for continuous production, to protect workers against dust and explosion and to keep the lighting conditions up to standard.

Lightweight fast working Spencer Swivel handle vacuum tools, with tremendous vacuum power and the fact that debris is easily removed from the vacuum machine, are three reasons why Spencer Vacuum is used extensively in industry.

Spencer Portable and Stationary Systems are also used to clean machinery and finished goods, reclaim metals, and move materials such as sand, cinders, and sawdust. All explained in Bulletin No. 125. Ask for it.

SPENCER VACUUM CLEANING
HARTFORD
THE SPENCER TURBINE COMPANY, HARTFORD, CONN.

263A

that the same paint is not desirable on all surfaces, and the right paint must be used in the right places. Many changes in painting procedure are necessary because of restrictions on available materials. However, suitable paints are available, and it is never too late to start painting. If surfaces have been unpainted for a long period of time, see that the surface is well prepared before new paint is applied. Otherwise the new paint will chip and peel.

Drainage

Drainage of surface water is important. It is doubly important if there are leaks through subsurface walls. The inspector checks all downspouts and all yards immediately surrounding the building. Whenever water stands in puddles or runs against the basement walls, take steps to correct drainage. Grading or additional sewers may be indicated. Existing sewers may be clogged or of inadequate size. Drains in window wells become clogged and need cleaning. Check every window well for cracks, drains, missing screens, and windows that do not work properly. Where window wells are so situated as to constitute a hazard, be sure they have protective grilles or railings. Replace or repair any of these protective devices that are missing or defective.

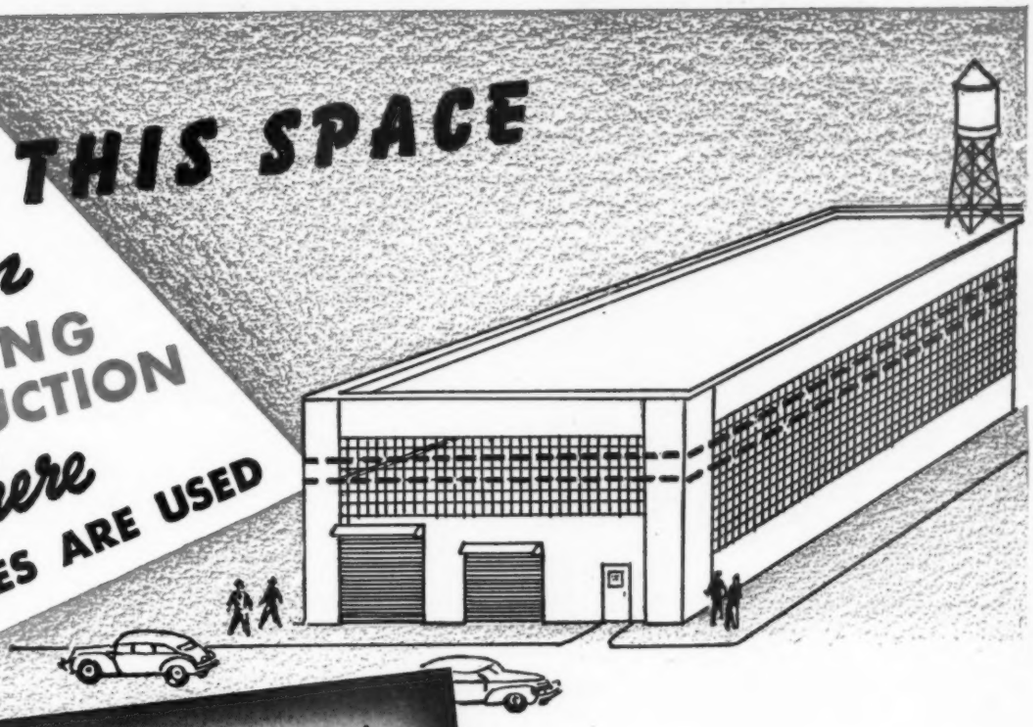
Platforms

Loading or shipping platforms are frequently neglected. They are subjected to severe abuse and often are in dangerous condition. Here the inspector looks for nails and jagged splinters that so frequently cause injuries. Loose planking, broken columns, sagging roofs, and leaking roofs all call for prompt and effective repair. The supporting structure of these platforms requires special attention. Here again overloading is common, and whole sections of a platform may fail if the substructure is not in good condition. Routine checks are made to prevent sinking of footings and rotting or splitting of timbers.

Piping

The inspection of all pipelines is similar. Leaks in pipes, fittings, and valves are of prime importance and are immediately corrected in the well-maintained plant. The leak rarely grows better. It usually grows worse and may cause considerable damage. Hangers, expansion joints, and valves need periodic inspection, particularly if located where they are subject to mechanical damage. Clean and paint pipes that have

SAVE THIS SPACE in BUILDING CONSTRUCTION where D-C CRANES ARE USED



Reduce heating and lighting needs—less piping too

THE cost of the horizontal section of building, illustrated above, represents a big investment. To include it means deeper footings, heavier building columns, extra requirements for heating, lighting, ventilating, etc.

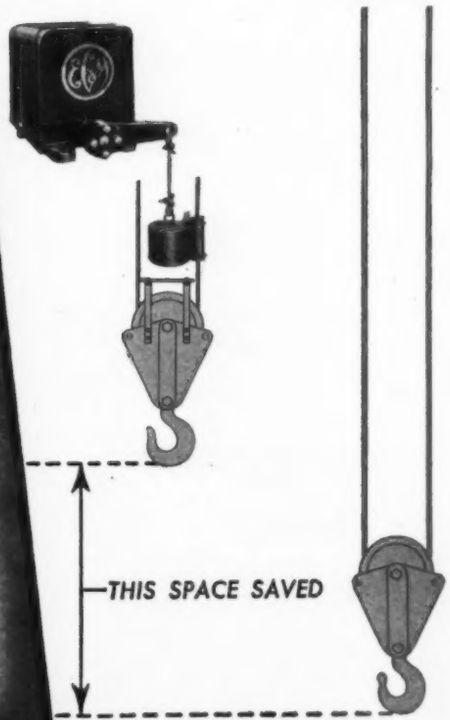
When such a building has D-c cranes geared for high production and equipped with anti-friction bearings, the hoisting speed of the empty hook may be as much as 2½ to 3 times full motor speed. This means that the tripping point for a circuit-opening limit stop must be set with sufficient clearance to insure safe stopping under this worst condition (empty hook at high speed).

The EC&M Youngstown Safety Limit Stop can materially reduce this distance and save construction costs. This Limit Stop not only disconnects the motor from the line but aids the hoist-brake in bringing the hook to rest quickly by dynamic braking. And being operated directly by the hook-block, stretching of the hoisting cables in no way affects the *final* stopping point.

Before planning new buildings, investigate this EC&M Youngstown Safety Limit Stop. Bulletin 1035 gives complete description and shows many interesting illustrations of how it is applied to overhead traveling cranes. Write for a copy.

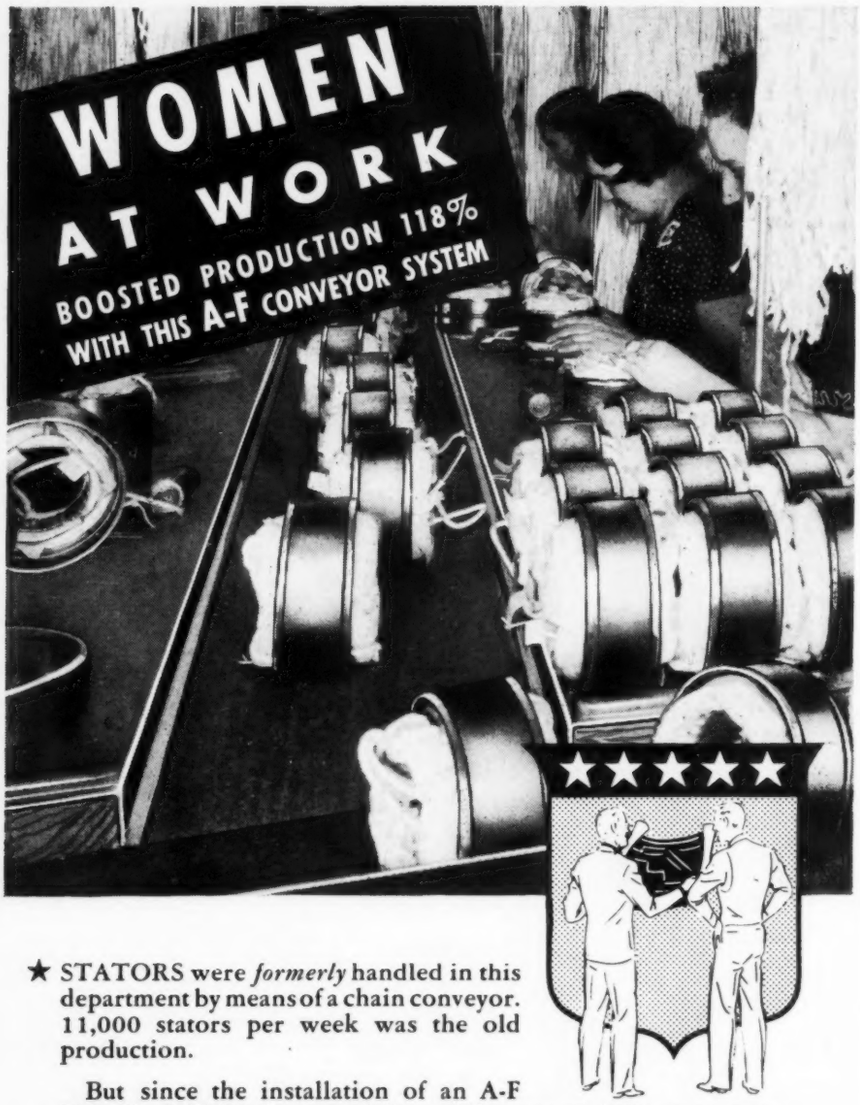
QUICK-STOPPING type of LIMIT STOP gives MINIMUM DRIFT

CIRCUIT-OPENING type of LIMIT STOP requires GREATER CLEARANCE for DRIFT



THE ELECTRIC CONTROLLER & MFG. CO.

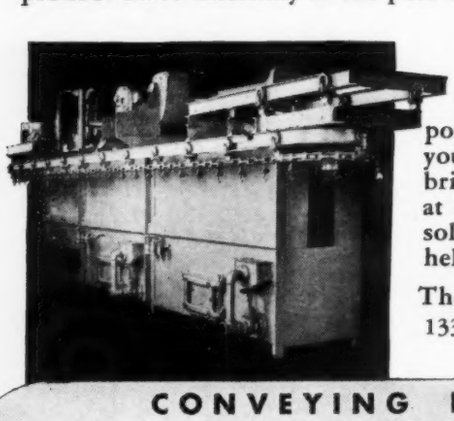
CLEVELAND ★ OHIO



★ STATORS were *formerly* handled in this department by means of a chain conveyor. 11,000 stators per week was the old production.

But since the installation of an A-F Belt Work Table System giving *endless stream indoor* transportation in the assembly department of this manufacturer of motors, 24,000 stators a week are now being conveyed! And protection against scraping the stators is an added feature.

★ Alvey-Ferguson Metal Products Cleaning and Finishing Equipment is also helping many a plant hang up new production records now—and with few or no changes will continue to help plants produce more efficiently in the post war era.



If *you* have a metal products cleaning problem—or a product or materials handling "indoor transportation" problem—and if you're producing products to bring Victory faster, write us at once. If there's a way to solve it, A-F Engineers can help you.

The Alvey-Ferguson Co., 133 Disney St., Cincinnati, O.

CONVEYING EQUIPMENT

Alvey-Ferguson

METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

rusted. Test both wet and dry sprinkler systems periodically. It is advisable to open the ends of each sprinkler run to assure unobstructed flow through the sprinkler lead. One company recently removed over three bushels of sticks, stones, and other obstructions from its system.

The general piping and plumbing systems require more frequently checking and testing than any other part of the building. Inspections in toilets and washrooms need to be frequent to assure the proper operation of flush valves and drainage. Examine radiator valves, air vents, and control equipment at the beginning of each heating season, and as needed throughout the season. Remedy every defect. With a good upkeep program in force, unit heaters, including valves, traps, motors, and control devices are similarly inspected and serviced.

Isolated Buildings

Do not overlook small isolated buildings, such as those used for housing pumps, inflammable materials, cars, and the like. Perhaps they are not as important as the main buildings, but the same things happen to them and these things need repairing. It is cheaper to repair than to neglect.

Building Services

Important parts of any building that require frequent inspection are not a part of the building itself, but may be classed as building services. Included in this category are the heating and ventilating system, all piping and plumbing, including the sprinkler system, and lighting and electrical wiring. Inspections of these facilities may be made by plumbers or electricians, or other inspectors.

Lighting

One of the most common troubles of industrial lighting is dirt. There is a tendency in many organizations to put up a fixture and neglect it until the bulb or tube burns out. The burned-out bulb is then replaced and *perhaps* the reflector is wiped with a dry cloth. Thus the efficiency of the lighting is greatly reduced. In some cases the intensity is lowered to a point of hazard. The lighting inspector watches for dirty fixtures, burned-out lamps and tubes, improperly placed wiring, hot contacts, defective switches or fixtures, circuit overloading—in fact, any violations of the electric code. Loose connections are promptly tightened, as they may be

(*Continued on page B-131*)

(Continued from page B-106)

dangerous in the presence of dust or gaseous atmosphere. Where explosion-proof fixtures are required, be sure the explosion-proof attachments are properly in place and accurately seated.

Inspection Reports

Reference has been made to inspection reports. These reports can take many forms. A good one lists every point requiring inspection, has plenty of space to show the location of defects, to indicate the repair of the defect, and to indicate spots that are to be observed on the next inspection trip. Copies of these inspection reports go to maintenance supervisors who are charged with the task of making things right.

The maintenance supervisor or his men record the date each repair is made. When all work is completed, the report is returned to the inspector. Company procedures vary, but in general the report form is used and retained as a record of building inspection and maintenance.

The following check-list will be helpful in the preparation of a building inspection form. It includes most of the parts of the building that require inspection—columns, doors, floors, etc.; suggests some of the faults and defects the inspector looks for; lists some of the underlying causes of those faults and defects.

Inspection Check-List

BEAMS AND GIRDERS, Concrete

Faults and defects to look for:

Cracks
Checks
Spalls

Causes:

Excessive loads, moisture, settling

BEAMS AND GIRDERS, Steel

Faults and defects to look for:

Bent flanges
Twisted girders
Loose rivets
Loose bolts
Rust

Causes:

Overloading, vibration, lack of paint

COLUMNS, Brick

Faults and defects to look for:

Loose or missing brick
Loose mortar
Defective pointing

(Continued on page B-132)

VITAL
"Air Wardens"
of INDUSTRY
PANGBORN Dust Collectors are silent sentinels standing guard over large and small industrial plants.
Wherever dust is produced they quickly, efficiently and economically collect it at its source—protecting your products, your equipment and your working conditions.
Don't fool yourself about DUST. It is a BIG problem in EVERY PLANT. Yet it can be CONTROLLED. For interesting data and bulletins "COME TO PANGBORN"—and get valuable facts about these vital "Air Wardens" of Industry. No obligation, of course.
PANGBORN
WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT
PANGBORN CORPORATION HAGERSTOWN, MD.

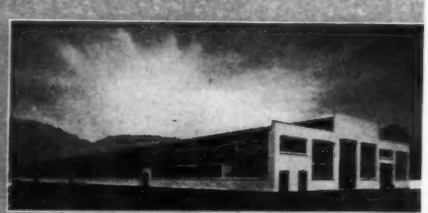
For the Emergency..

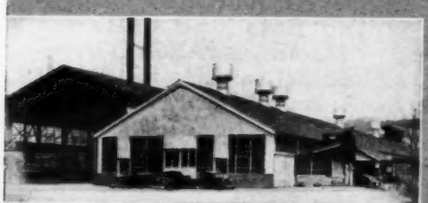
AND A LONG TIME AFTER!

INDUSTRIAL BUILDINGS and PLANT ADDITIONS
DESIGNED, FABRICATED AND ERECTED BY . . .

PITTSBURGH • DES MOINES

Furnished under one contract, one responsibility—on schedules of pressing urgency—these typical examples of recent Pittsburgh-Des Moines construction are *built to endure*. The complete facilities of this organization, as experienced building contractors in the industrial field, are at your service—with satisfaction guaranteed!





PITTSBURGH-DES MOINES STEEL CO.
PITTSBURGH, PA. 3458 NEVILLE ISLAND—DES MOINES, IA. 959 TUTTLE ST.
NEW YORK, ROOM 944, 270 BROADWAY . . . CHICAGO, 1262 FIRST NATIONAL BANK BUILDING
DALLAS, 1263 PRAETORIAN BUILDING . . . SAN FRANCISCO, 665 RIALTO BUILDING
SEATTLE, 1166 EIGHTH AVE., SOUTH

(*Continued from page B-131*)

Causes:
Poor mortar, settling, overloading, mechanical injury

COLUMNS, Concrete

Faults and defects to look for:
Cracks
Spalls

Causes:
Settling, overloading, moisture, mechanical injury

COLUMNS, Steel

Faults and defects to look for:
Rust
Loose rivets and bolts
Bent flanges

Causes:
Lack of paint, overloading, vibration, mechanical injury

COLUMNS, Wood

Faults and defects to look for:
Dry rot
Decay
Cracks
Checks

Causes:
Insufficient moisture, overloading, shrinkage, mechanical injury

DOORS, Steel

Faults and defects to look for:
Damaged or missing fuse links
Loose hinges
Damaged cover
Latches
Missing counterweights
Defective operating mechanism

Causes:
Rough usage, improper attention

DOORS, Wood

Faults and defects to look for:
Loose hinges
Damaged latches
Broken glass
Sagging and swelling
Weathering
Splits or breaks

Causes:
Slamming, bumping with trucks, too light hardware, no paint

DOOR FRAMES, Steel

Faults and defects to look for:
Leakage around frame
Rust

Causes:
Improperly calked, no paint

(*Continued on page B-134*)

HAVE YOU READ ABOUT 'EM?

made by the makers of Johnson's famous **WAX-FORTIFIED** *Paints*

For economical wartime maintenance in:

● *Mills* ● *Factories* ● *Foundries* ● *Power Plants*
● *Warehouses* ● *Machine Shops* ● *Offices* ● *Shipyards*

We took the best materials available. We blended them with the same precision and skill which go into all Johnson Products.

And now this new War-Formula Paint is ready . . . ready to help reduce paint maintenance problems and costs to a minimum! In it are retained as many as possible of the advantages of Johnson's Wax-Fortified Paints.

Send for the facts about Johnson's War-Formula Paints and Enamels . . . finishes which provide from 400 to 600 sq. ft. coverage per gallon, finishes whose drying time is uniform, finishes you can brush or spray on, quickly and easily. Mail the coupon today.

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Industrial Maintenance Division, Dept. FM-43, Racine, Wisconsin

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To so many of you, we owe our thanks for the reception you have given Johnson's Wax-Fortified Paints and Enamels in the last few years. Their rise in popularity has been remarkable by any standard.

Because some of the products used in Johnson's Wax-Fortified Paints are vitally needed by our government now, we have discontinued the line until after the war, rather than use substitute materials.

But this we promise. When we are able to produce Johnson's Wax-Fortified Paints again, they will be even better than before.

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Industrial Maintenance Division, Racine, Wisconsin

Please send me a copy of your illustrated booklet, "Johnson's War-Formula Paints," giving complete information on and specifications for the use of Johnson's new War-Formula Paints and Enamels.

"Xtra! Xtra! Read all about it! Send coupon for your copy today!"

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Save scrap to beat the Jap—to hurry Hitler to defeat. Save time and manpower with mechanized material handling. Put Standard Conveyors and Standard equipment to work . . . to convey . . . lower . . . lift . . . pile . . . or tier materials and merchandise in your plant. If your products are considered necessary to the war effort, Standard Conveyors are available for your needs. Write for full information and a copy of Bulletin FM-4 "Conveyors by Standard"—a valuable handbook on conveying methods.

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General Offices: NORTH ST. PAUL, MINN.

Sales and Service in All Principal Cities

★ ENGINEERED FOR FASTER PRODUCTION ★

(*Continued from page B-132*)

DOOR FRAMES, Wood

Faults and defects to look for:
- Leakage around frames
- Rotting

Causes:
- Improperly calked, no paint

FLASHING

Faults and defects to look for:
- Loose sections
- Flashing separated from roof
- Corroded areas
- Trash
- Missing sections

Causes:
- No paint, improper seal, not cleaned

FLOORS, Asphalt

Faults and defects to look for:
- Heaving
- Holes and cracks
- Gouges

Causes:
- Heavy trucking, overloading, poor subfloor

FLOORS, Concrete

Faults and defects to look for:
- Holes and cracks
- Spalled areas

Causes:
- Heavy trucking, blows, settling, improper drainage

FLOORS, Linoleum, Tile

Faults and defects to look for:
- Cracks
- Peeling
- Lifting

Causes:
- Heavy traffic, poor subfloor, lack of glue

FLOORS, Steel Plate

Faults and defects to look for:
- Loose fastenings
- Broken plates
- Uneven surfaces

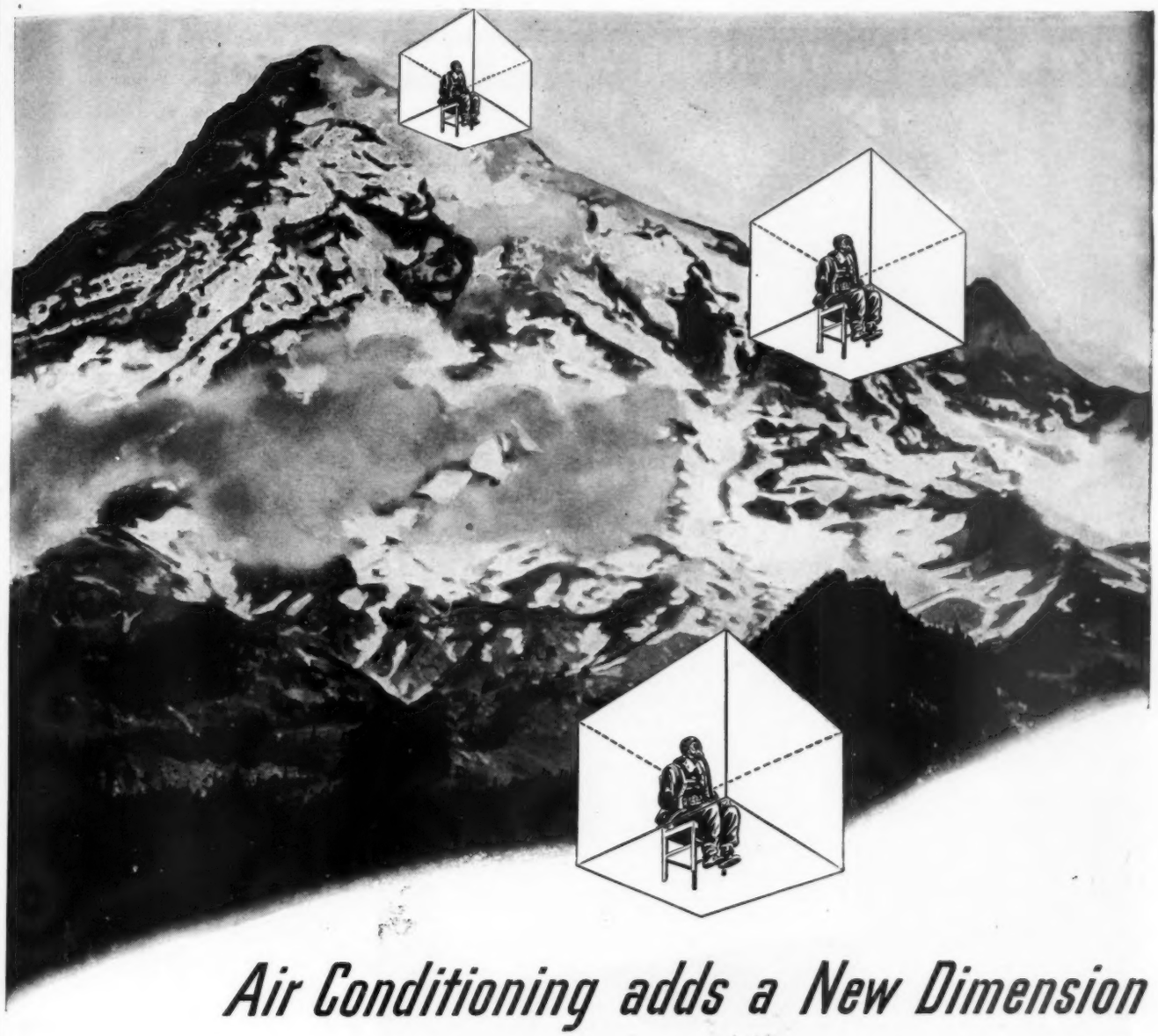
Causes:
- Improper support, heavy loading, rough usage

FLOORS, Wood Board

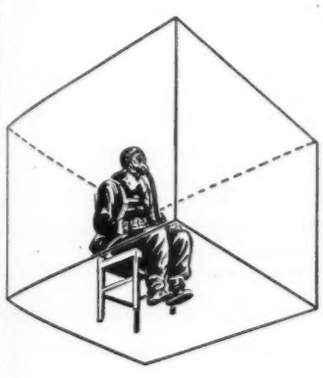
Faults and defects to look for:
- Cracks
- Splinters
- Missing boards

Causes:
- Heavy traffic, change in direction of trucking, improper support, overloading

(*Continued on page B-136*)



Air Conditioning adds a New Dimension



Originally, people thought of air conditioning only in terms of *temperature*. It cooled the air on a warm day. Temperature was air conditioning's *first* dimension.

Then came a second dimension . . . *movement*. Air had to be moved . . . under control.

Then a third dimension . . . *humidity* . . . control of the amount of moisture in the air.

Then, air conditioning took on a fourth dimension . . . *dust exclusion*.

And now, air conditioning is cooperating in an important new field . . . controlled air *pressure*. This is needed for the testing of men and equipment under the conditions of stratosphere flying.

Today, air conditioning faithfully reproduces *exact climates* . . . from the parched heat of the Sahara to the frigid cold of Northern Russia. The equipment that does this must be more flexible, more compact than ever before . . . with precise control of temperature and humidity.

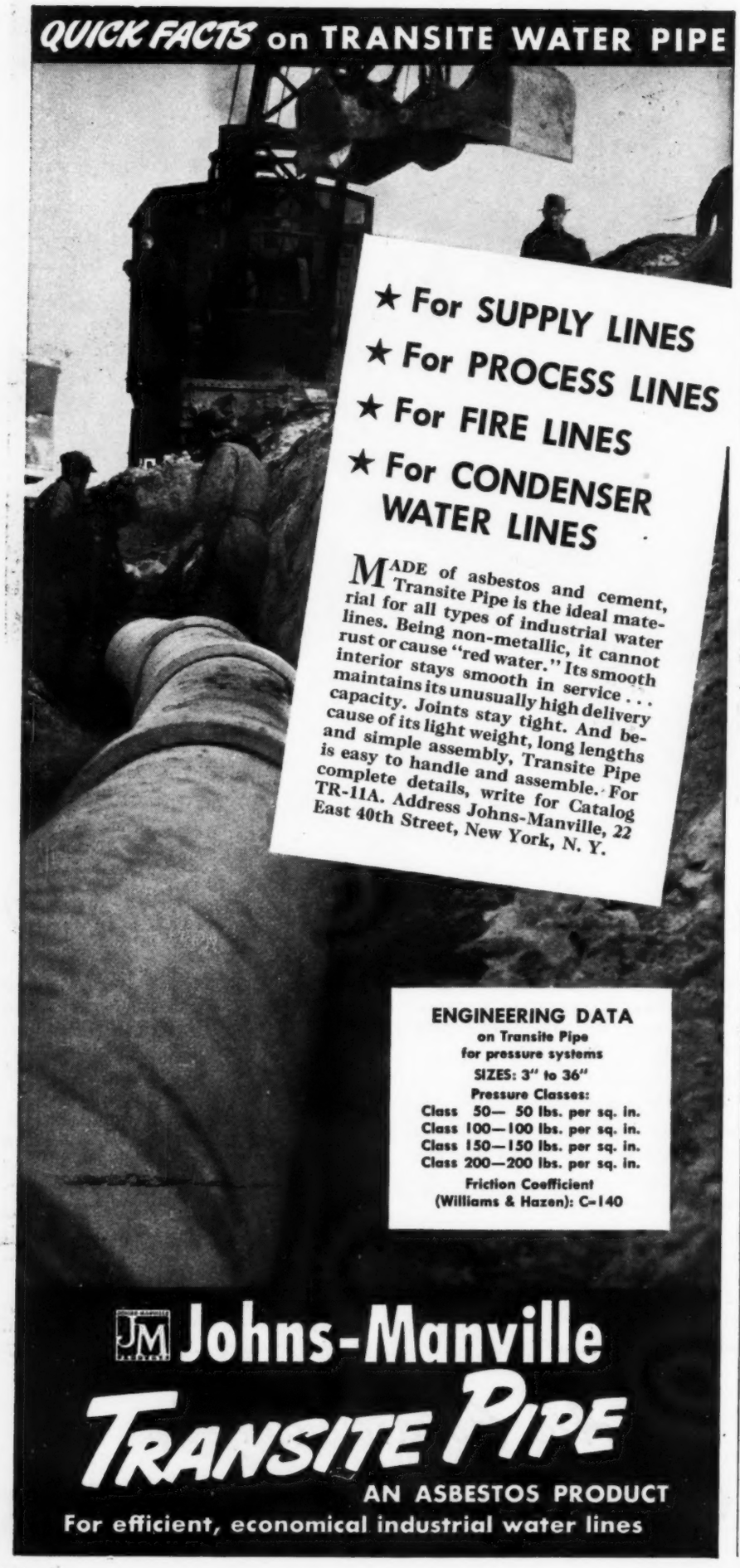
This equipment . . . from General Electric . . . speeds up America's war effort. When peace comes, this improved air conditioning will become available for many new uses.

Then, as now, look to General Electric as the outstanding supplier of up-to-date air conditioning and industrial refrigeration equipment of all kinds.

Air Conditioning and Commercial Refrigeration Department, Division 434, General Electric Company, Bloomfield, New Jersey.

Air Conditioning by

GENERAL ELECTRIC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MADE of asbestos and cement, Transite Pipe is the ideal material for all types of industrial water lines. Being non-metallic, it cannot rust or cause "red water." Its smooth interior stays smooth in service . . . maintains its unusually high delivery capacity. Joints stay tight. And because of its light weight, long lengths and simple assembly, Transite Pipe is easy to handle and assemble. For complete details, write for Catalog TR-11A. Address Johns-Manville, 22 East 40th Street, New York, N. Y.
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Friction Coefficient
(Williams & Hazen): C-140
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TRANSITE PIPE
AN ASBESTOS PRODUCT
For efficient, economical industrial water lines

(Continued from page B-134)

FLOORS, Wood Block

Faults and defects to look for:

Loose blocks
Broken blocks
Holes

Causes:

Heavy traffic, change in direction of trucking, improper support, overloading

LIGHTING

Faults and defects to look for:

Dirt
Burned-out bulbs and tubes
Defective switches
Defective ballasts
Loose connections
Burned-out fuses
Defective circuit breakers
Overloaded circuits
Defective insulation
Defective portable cords
Loose receptacles

Causes:

Normal wear, lack of proper maintenance, mechanical damage

PAINT

Faults and defects to look for:

Peeling
Blistering
Wrinkling
Discoloration

Causes:

Improper application, age

PIPING

Faults and defects to look for:

Leaks
Rust
Sweating
Defective expansion joints
Loose or broken hangers
Faulty covering
Lack of paint
Improper slope
Cracked fittings
Mechanical injuries

Causes:

Normal wear, no paint, mechanical damage

RADIATORS

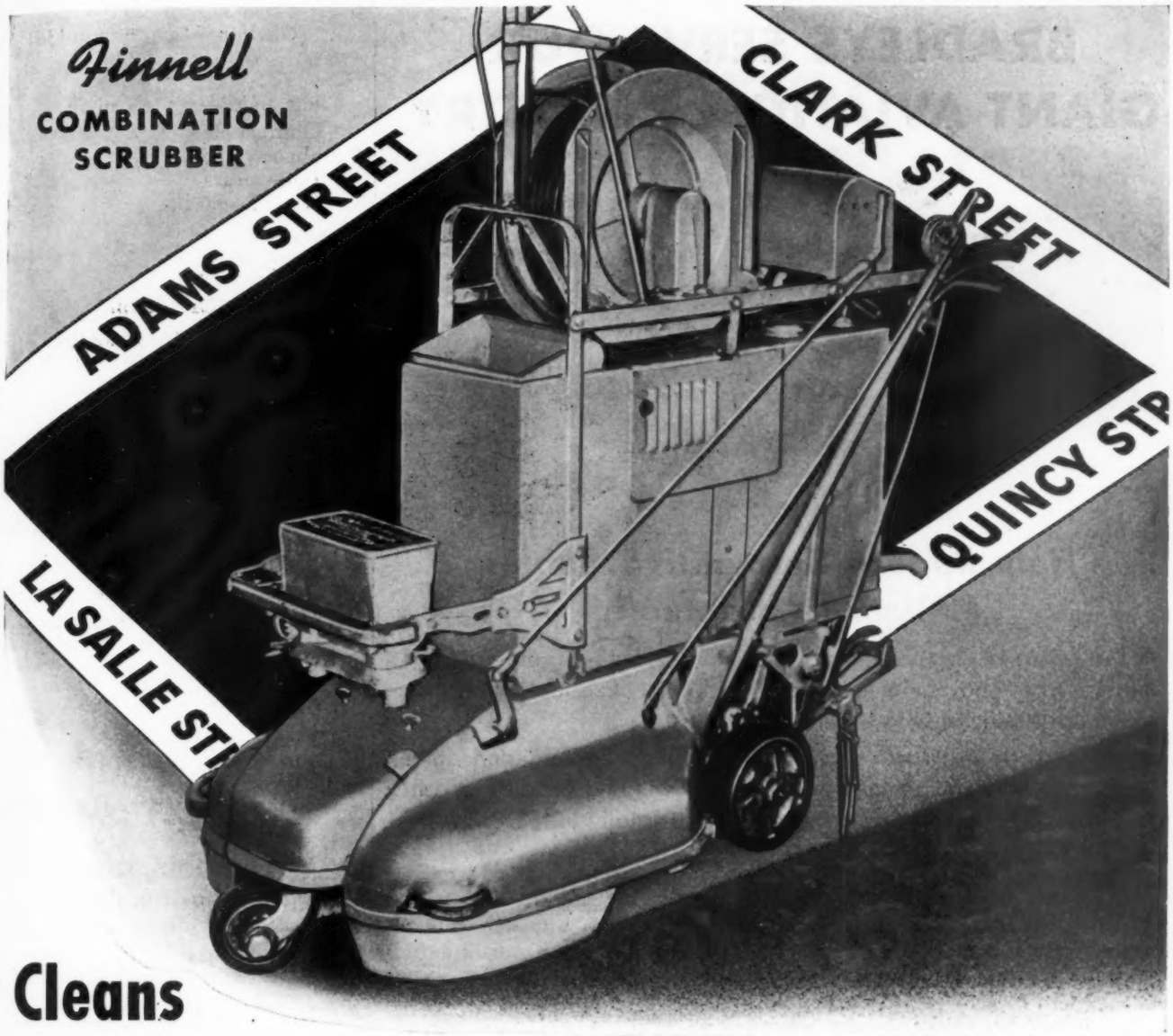
Faults and defects to look for:

Dirt
Leaks
Improper slope
Improper position

Causes:

Normal usage, settling, poor housekeeping

(Continued on page B-138)



Cleans Floor Area Size of City Block in 6½ Hours!

That gives you some idea of the amazing speed of a *Finnell Scrubber-Rinser-Drier* . . . of the vast saving in man-power that is being effected in cleaning large-area floors of war production plants. This *all-in-one* cleaning unit, in the largest size, has a capacity of 8,750 sq. ft. of floor per hour! Requires just one operator for the scrubbing, rinsing, and drying operations.

If your plant is engaged in war work and has a floor-maintenance problem such as providing safer floors for workers . . . conserving man-power on the cleaning crew . . . keeping white floors white . . . cleaning floors in a plant on 24-hour production — talk it over with the nearby *Finnell* man. He has the practical solution, and it's yours for the asking.

For consultation, free floor survey, or literature, phone or write nearest *Finnell* branch or Finnell System, Inc., 2504 East Street, Elkhart, Indiana.

FINNELL SYSTEM, INC.

Pioneers and Specialists in

FLOOR-MAINTENANCE EQUIPMENT AND SUPPLIES

BRANCHES IN ALL PRINCIPAL CITIES

BRADLEYS SERVE OUR GIANT AVIATION INDUSTRY

Help Reduce Dermatitis Troubles Minimize Absenteeism

● The heads of our fastest growing industry, knowing the value of modern tools and equipment, were quick to realize the importance of sanitary and adequate washing facilities.

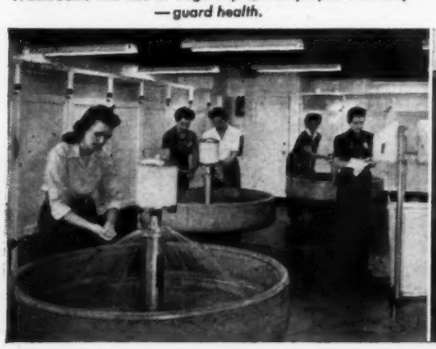
In the modern miracle plants where planes, engines and other vital parts and equipment are made, you will find Bradley Washfountains. The list that can be given only partially includes:

Bendix Aviation Corporation
Bell Aircraft
Boeing Airplane Co.
Buick Motor Aviation Engine Plant
Cessna Aircraft Corp.
Consolidated Aircraft Corp.
Curtiss Wright Corp.
Douglas Aircraft Co.
Fisher Body Corp. Aircraft Div. of G. M. C.
Ford Willow Run Bomber Plant
Fort Worth Bomber Plant
Lockheed Aircraft Corp.
Glenn L. Martin Co.
North American Aviation Inc.
Pan American Airways
Pratt Whitney Aircraft Co.
Republic Aviation Co.
Studebaker Motor Aircraft Engine Parts Plant
United Aircraft Co.
Vega Airplane Co.
Vought Sikorsky
Wright Aeronautical Corp.

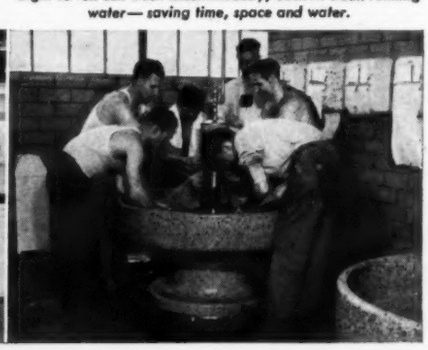
For assistance in washroom planning, write for "Washroom Layout Booklet." BRADLEY WASHFOUNTAIN CO., 2215 W. Michigan Street, Milwaukee, Wisconsin.

BRADLEY washfountains

Washrooms like this at Vega improve employee efficiency — guard health.



Eight to ten can wash simultaneously, each in clean running water — saving time, space and water.



(*Continued from page B-136*)

RAMPS

Faults and defects to look for:
Obstruction
Slippery spots
Dark areas
Loose hand rails

Causes:
Normal usage

ROOFS, Built-Up

Faults and defects to look for:
Trash
Separated seams
Blisters and cracks
Pinholes
Dried-out spots

Causes:
Shrinkage, improper bonding, normal aging

ROOFS, Roll

Faults and defects to look for:
Trash
Separated seams
Blisters and cracks
Pinholes
Dried-out spots

Causes:
Shrinkage, improper bonding, normal aging

ROOFS, Slate

Faults and defects to look for:
Loose slates
Broken slates

Causes:
Normal wear, rusted nails, wind

ROOFS, Miscellaneous

Faults and defects to look for:
Rust
Disintegrated tile
Broken shingles

Causes:
Normal wear

SANITARY FIXTURES

Faults and defects to look for:
Leaks
Cracks
Fastenings
Drains
Dirt

Causes:
Normal usage, mechanical damage, settling

SASH, Steel

Faults and defects to look for:
Dirty glass
Broken glass
Rusty parts

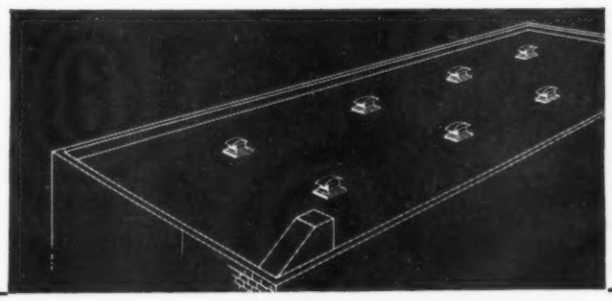
(*Continued on page B-140*)

Carrier
WAR PLANT VENTILATORS

Installed in Roof . . .
No Floor Space Needed!

War plant workers need air free from excessive heat or humidity to maintain maximum production. In warm weather, extra quantities of outdoor air must be provided for ventilation to prevent indoor temperatures from soaring. In winter weather, the air for ventilation must be tempered to prevent drafts and cold areas.

Carrier War Plant Ventilators replace hot, humid air in summer—temper ventilating air in winter. They are available in 3 types to provide blackout and other factory buildings with uniformly distributed air for correct ventilation.



1. **Carrier Exhaust Ventilators** (shown above) remove hot, humid air from the plant, exhausting it at the roof.

2. **Carrier Supply Ventilators** replace the excessively hot plant air with relatively cool air from outdoors, drawing the air in at the roof and supplying it with uniform circulation to working areas.

3. **Carrier Tempering Ventilators** warm and deliver air to the plant, drawing the air in at the roof and supplying it with uniform circulation to the working areas, thereby providing the needed ventilation with tempered air to prevent drafts and cold spots in the plant during cold weather.

Features: Critical materials conserved by use of non-ferrous panels. No extra "preparedness" for blackout plants—no light transmission or reflection in blackouts. No protective housing or elaborate roof supports. Built to withstand weather. Light in weight. Designed to become a permanent part of the building. Constructed to keep out rain and snow.

Mail coupon for complete information. Learn how Carrier War Plant Ventilators can be used to advantage in your plant.

CARRIER CORPORATION, Syracuse, N. Y.

Please send literature on Carrier War Plant Ventilators. Desk 33-D

Name.....

Company.....

Address..... City.....

Carrier

ARMY E NAVY

AIR CONDITIONING • REFRIGERATION

...because of this: the Cardox Fire Extinguishing System, known to management and employees by this identifying Pushbutton Station.

It signals that the Cardox System will detect and extinguish fire through the automatically controlled system.

It means also that, by pushing a button, an employee can extinguish a fire—even before it is "picked up" by the fire detectors.

ENGINEERING victory in production can be lost without an engineering victory over fire. Realizing this vital truth was a foremost factor in the selection of Cardox Fire Extinguishing Systems . . . in important plants producing military necessities, such as:

Electric Power	Ships
Aviation Engines	Chemicals
Aviation Carburetors	Foods
Airplane Parts	Building Material
Ordnance	Combat Boats
Armor Plate	Hot Strip Steel
Processed Fabric	Rubber Products
Tanks	Forgings
Tank Engines	Solvents
Engine Parts	Motor Fuel
Cold Strip Steel	Trainer Engines
Plastics	Airplanes

ENGINEERING PROBLEM: To be certain of operation *without interruption* by fire, engineers demanded: (1) extinguishing coverage for each specific hazard, (2) immediate extinguishment—and cooling, (3) no damage from the extinguishing medium, and (4) uniform extinguishing performance under all prevailing conditions—summer or winter.

ENGINEERING SOLUTION: War plant engineers found, in Cardox Fire Extinguishing Systems, the solution to each fire problem, large or small.

Engineered application provides a mass discharge of Cardox CO_2: in *pounds* of liquid for small fires, in *tons* for large ones. Added to fast, complete extinguishment is the uniform, enhanced cooling characteristic of Cardox CO_2—through a high yield of CO_2 snow.

As typical in extinguishment by carbon dioxide, there is no damage by the extinguishing medium. Yet, in summer or winter, Cardox CO_2 gives uniform performance—always ready, at 0° F. and 300 psi.

NO SHORTAGE HERE: Since Cardox makes *no* use of high pressure containers—deliveries on which are restricted by WPB Order M233—delivery of Cardox CO_2 is being made *without difficulties* to owners of Cardox Systems by the Cardox fleet of railway tank cars, trucks and trailers.

Today Cardox Fire Extinguishing Systems are making it possible for the Armed Forces of America and its allies to have MORE planes, guns, tanks, ammunition. If you would like to know more about performance of Cardox Systems, write on your company letterhead for Bulletin 1143.

CARDOX CORPORATION
BELL BUILDING, CHICAGO, ILLINOIS
District Offices in New York • Washington • Detroit
Cleveland • Atlanta • Pittsburgh • San Francisco
Los Angeles • Seattle

MASS DISCHARGE OF CO2 · ENHANCED COOLING EFFECT · CENTRAL STORAGE UNIT · AMPLE CO_2 RESERVE · ENGINEERED SYSTEMS · MANUAL OR AUTOMATIC CONTROL

CARDOX

NON-DAMAGING FIRE EXTINGUISHING SYSTEMS

(*Continued from page B-138*)

Loose or missing putty
Broken or missing sash cords
Defective hinges
Damaged hardware
Faulty operation

Causes:
Lack of paint, dried-out putty, improper use, age

SASH, Wood

Faults and defects to look for:
Dirty or broken glass
Rotted wood
Loose or missing putty
Broken or missing sash cords
Broken pulleys
Defective latches
Defective weather stripping
Faulty operation

Causes:
Lack of paint, dried-out putty, rough use, age

SKYLIGHTS

Same faults and defects as in sash

SPRINKLER UNITS

Faults and defects to look for:
Condition of fuse
Location
Mechanical damage
Paint

Causes:
Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

STAIRS, Concrete

Faults and defects to look for:
Defective treads
Loose hand rails
Slippery treads
Poor illumination
Obstructions

Causes:
Normal wear, insufficient housekeeping

STAIRS, Steel

Faults and defects to look for:
Rust
Slippery treads
Loose hand rails
Loose plates
Poor illumination
Obstructions

Causes:
Normal wear, improper housekeeping, no paint

STAIRS, Wood

Faults and defects to look for:
Worn paint
Worn treads

(*Continued on page B-142*)

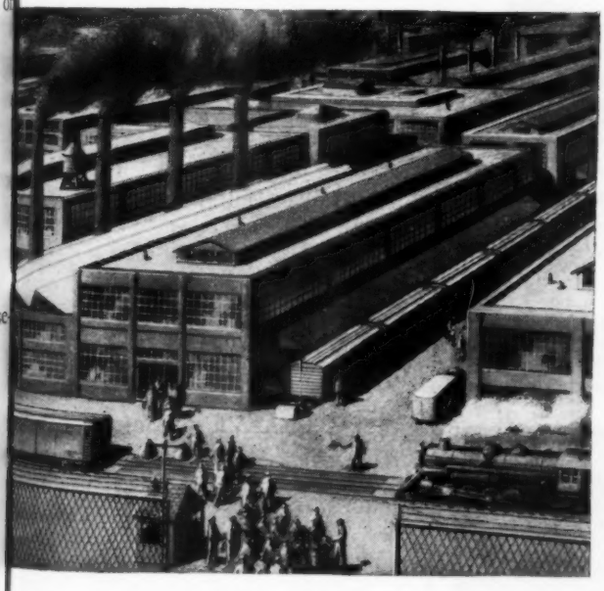
WHEN IT'S "FULL SPEED AHEAD" FLOW CONTROL GETS GOING—FAST

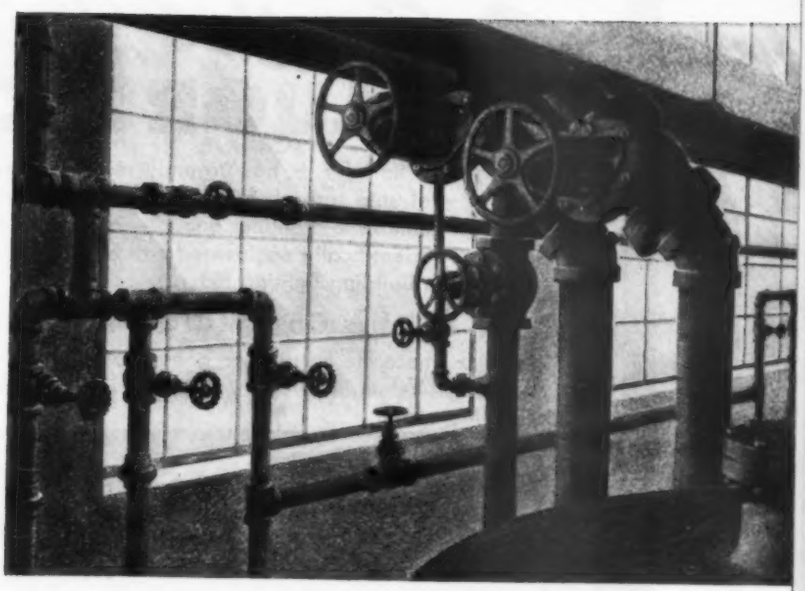
WHEN the order "full speed ahead" goes down to the engine room, the answer surges to the propellers through precise control of the flow of steam. That means valves—most often Crane valves.

For serving the Navy is nothing new for Crane. From the days when the ironclads became the final answer to sea power, Crane valves have been doing their part in assuring our Navy the world's best fighting ships.

At Crane, flow control means more than the final function of a valve. It means control of engineering, of research, of distribution—of all the techniques and the facilities for meeting industry's great demands—not only in war but in peace as well. It means the ability to get valves—the right kind—*where* they are needed—*when* they are needed. This is Crane flow control service—important for American industry—and for America's war effort today.

Crane Co., 836 So. Michigan Avenue, Chicago, Ill.





It takes a big supplier to meet the demands for flow control in industry. That's why the leaders have long turned to Crane, largest manufacturer of valves in America. For at Crane they could find not only the diversity of valves they needed, but also the understanding of big industries' requirements in product, service and technical assistance to assure adequate flow control.

Follow any pipe line and, at frequent intervals, you'll encounter a valve. Valves are essential to the control of the flow for which the pipe line exists. And because flow through pipe is so basic in American industry and American life, the *availability* of valves is of prime importance to industry. To provide that availability, Crane has established controlled distribution with more than 500 branches and wholesalers through which Crane valves and piping products may flow to their ultimate users.

CRANE *FLOW* CONTROL

THROUGH CRANE VALVES

Good Lighting Speeds WAR PRODUCTION these 7 ways!

1. Faster Seeing Means Faster Work
2. Better Work—Less Rejects
3. Older Employees Retain Efficiency
4. Reduced Eyestrain Prevents Fatigue
5. Accidents Reduced
6. Morale Improved
7. Less Dirt and Disorder Accumulate

Guth Specify Efficient FLUORESCENT

The W. P. B. has urgently recommended good illumination as a vital step toward full Production Efficiency. To be sure of getting the utmost in lighting quality, insist on dependable GUTH Fluorescent—scientifically engineered and backed by 41 years of sound experience in building lighting fixtures.

Guth Is the *Complete* Fluorescent Line!

No matter where the installation goes—no matter what level of illumination must be maintained—you'll find the right lighting answer in GUTH Fluorescent.

Write Today for Valuable Data on Industrial Lighting. Get the facts about increased production through better lighting.

★ ★ ★ ★ ★ ★ ★ ★

Leaders in Lighting Since 1902 Guth

★ ★ ★ ★ ★ ★ ★ ★

THE EDWIN F. GUTH CO. • 2615 Washington Ave. • St. Louis, Mo.

(*Continued from page B-140*)

Loose hand rails
Broken boards
Miscellaneous litter
Poor illumination
Slippery treads
Obstructions

Causes:

Long usage, poor maintenance, improper housekeeping

TRAPS

Faults and defects to look for:

Leaks
Cracks
Stoppage
Dirt
Condition of seats

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

UNIT HEATERS

Faults and defects to look for:

Dirt
Bent fins
Defective motors
Defective controls
Improper support
Leaks
Wrong location

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

VALVES, Air

Faults and defects to look for:

Leaks
Dirt and corrosion
Missing valves
Wrong size

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

VALVES, Control

Faults and defects to look for:

Leaks at connection
Leaks through valve

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

VALVES, Flush

Faults and defects to look for:

Leaks
Improper adjustment
Defective floats

(*Continued on page B-144*)

Conditioned WEAPONS ARE WINNING THIS GLOBAL WAR

BETTER AIR FOR BETTER AIR POWER. Many aircraft parts must be so accurate that air conditioning is used in manufacturing to provide required rigid control of temperature, humidity and air cleanliness.

TASK TROOPS FROM MARS. Parachute cloth is tested under government specified air conditions. For this and for protecting stored 'chutes from drying and mildew, air conditioning is used.

MACHINE SHOP IN HADES. At a huge U. S. Base repair shop overseas, where 120° F. outdoors is common, air conditioning is used to make indoor working conditions tolerable, and for mechanical precision.

BRIDGE OF SHIPS. To insure perfect fit of matched sets of huge propulsion gears for cargo ships, gears are cut at a temperature held constant by air conditioning through the entire operation of several days.

FOOD IS A WEAPON. An army fights on its stomach. In processing, storage and in the distribution of food to our forces fighting on distant fronts in every part of the world, Industrial Refrigeration is an important factor.

Planes. 'Chutes. Repair Bases. Ship Gears. Food. Just a few of the countless war essentials on which Westinghouse Air Conditioning and Industrial Refrigeration are usefully employed. More and more producers are discovering how controlled temperature, humidity and air cleanliness mean uniform quality, precision, fewer rejections, faster production.

After Victory, Westinghouse Air Conditioning and Industrial Refrigeration will contribute toward a thousand new-day benefits. Better products at lower cost, greater year 'round comfort and convenience—better living for all.

The *heart* of every Westinghouse system is its exclusive Hermetically-sealed compressor—direct-driven, permanently-oiled, powered by refrigerant-cooled motor. Result: economy, dependability, long life.

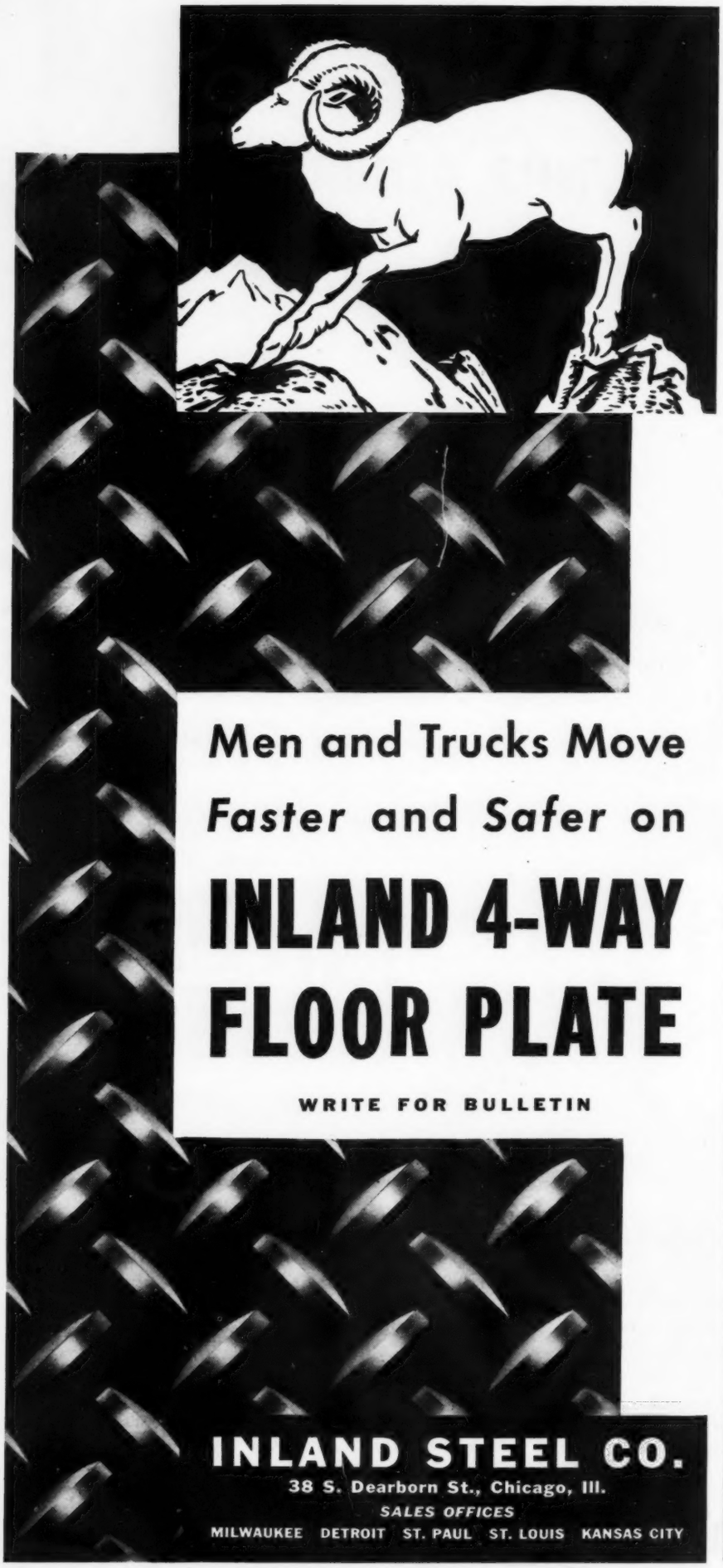
In helping solve "conditioning" problems, Westinghouse offers years of experience with thousands of installations. Inquiries are invited from producers of war materials, and from postwar planners. Westinghouse Electric & Mfg. Co., 627 Page Blvd., Springfield, Mass.

Westinghouse *Air Conditioning*

Geared to a Thousand Wartime Needs

Copyright 1943, Westinghouse Electric & Mfg. Co.

Tune in on John Charles Thomas, NBC, Sunday at 2:30 P. M., E. W. T.



(Continued from page B-142)

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing

VALVES, Hand

Faults and defects to look for:

Leaks
Dirt and corrosion
Missing valves
Improper size
Leaks through stem
Leaks at connections
Leaks through valve
Broken wheels
Broken stems
Cracked bodies

Causes:

Normal wear, mechanical injury, improper installation, lack of maintenance, freezing.

WALLS, Glass Brick

Faults and defects to look for:

Defective mortar
Broken bricks
Loose frames

Causes:

Weather, mechanical damage

WALLS, Inside

Faults and defects to look for:

Cracks
Holes
Looseness
Broken and missing brick
Spalled areas
Damaged doorways

Causes:

Settling, mechanical damage, insufficient maintenance

WALLS, Outside, Brick

Faults and defects to look for:

Efflorescence
Cracks
Weathering
Loose mortar

Causes:

Water, weather, poor mortar, settling, shrinking

WALLS, Outside, Concrete

Faults and defects to look for:

Cracks
Spalling

Causes:

Water, freezing, settling, shrinking

WALLS, Outside, Steel

Faults and defects to look for:

Rust

(Continued on page B-146)

CONSERVE INDUSTRIAL EQUIPMENT with VALDURA HEAVY DUTY PAINTS

REPLACEMENT MATERIALS ARE NEEDED FOR WAR WORK

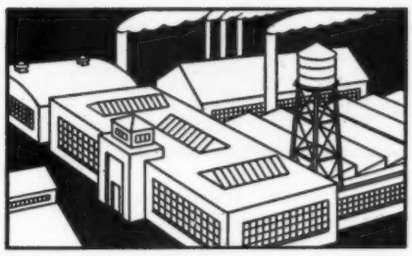
★ ★ ★ ★ ★

Most manufacturing and building materials are now vitally necessary for war work. Each time that replacements become necessary, due to rust or corrosion, sorely needed materials are diverted from their place in the war effort. Rust and corrosion go hand in hand with moisture, heat and general process fumes. Good paints are your sure protection against such conditions.

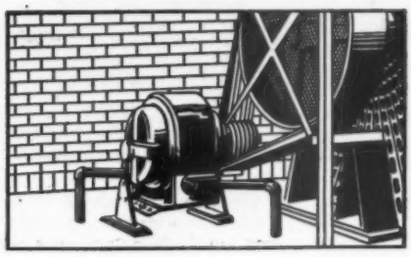
It is definitely wise for manufacturers to critically inspect their buildings and equipment now. Preventive maintenance is a patriotic duty as well as an effective means of reducing maintenance costs. Valdura suggests below some of the outstanding danger spots for industrial decay. Check your plant today and write to Dept. B for a copy of the Paint Selector to help solve your painting problems.

INSPECT YOUR PLANT—IS IT PAINT PROTECTED?

Check your metal beams, columns, trusses, window frames, piping, stairs, ventilators and ducts. They are constantly exposed to moisture and fumes that cause corrosion. Paints able to resist moisture, acids and alkali conditions should be specified for assured paint protection.

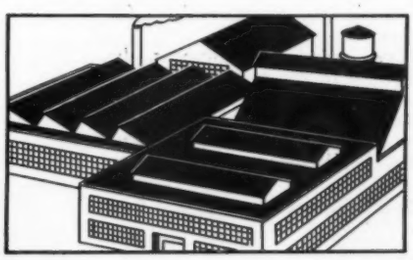


All outdoor equipment, exposed to changing weather conditions, smoke and grime, require priming and a heavy duty protective coating. Check all standpipes, gutters, downspouts, fire escapes, tanks, smokestacks and exterior wall surfaces. Special paints for each paint problem.



Examine machinery exposed to fumes, grime and dirt. They will last longer if painted. All floors, whether wood, metal, concrete or linoleum must be inspected for deterioration. Specify a paint able to stand vibration, washing, temperature extremes, abrasion and scuffing.

Critically examine interior walls and ceilings. They have a tendency to discolor and become dingy. Oil or resin emulsion paints in white or light colors can economically improve lighting as much as 65%, minimize accidents, increase morale and boost accurate production.



Watch your roofs carefully since they deteriorate quickly. Proper maintenance can prevent costly repairs and destruction. Composition-felt, metal, built-up or concrete roofs should be examined regularly so that they do not dry out. Skylights and flashings should be waterproof.

Many of the nation's manufacturers are using the widely known Valdura Heavy Duty Maintenance paints—specially formulated for the job they are to do. A paint for each job.

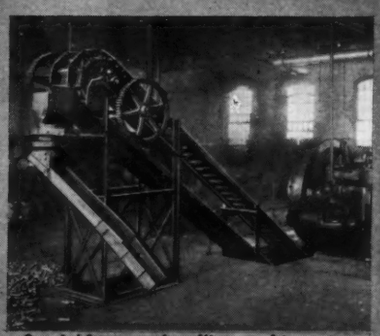
AMERICAN-MARIETTA COMPANY

43 E. OHIO STREET CHICAGO, ILL.

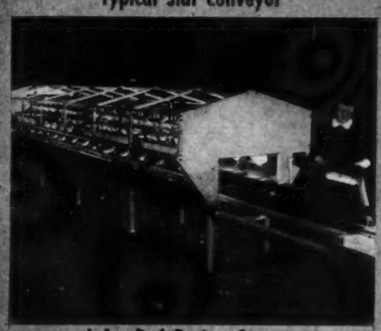
Plants at—Kankakee, Ill., Cleveland, Ohio, Marietta, Ohio, and High Point, N. C.

In time of ~~Peace~~ WAR prepare for ~~War~~ PEACE

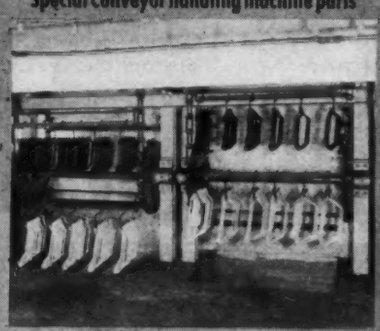
Typical Slat Conveyor



Special Conveyor handling machine parts



Infra-Red Drying Conveyor



Coil Dryer Conveyor

George Washington's advice is good even in reverse. It's none too soon to think of preparing to help meet the huge coming demand for peace-time goods. Why not now, while time permits, let Gifford-Wood plan with you to develop a material handling system that will enable you to compete successfully with others seeking the same business you will want?

There's real help along these lines available in the G-W organization. With unmatched experience in planning equipment and layouts, with many standard designs that are readily adaptable to special conditions, with an engineering development staff organized to tackle tomorrow's jobs as well as today's, G-W can relieve your busy engineers by working with them so you'll not lose months waiting for reconversion when that happy need arises.

While G-W shops are busy turning our war-time equipment, the engineering staff is adequate to give thought to the tomorrows. As a first step, you might look through G-W Catalog No. 200-F a 125-page idea book on elevating and conveying equipment for handling bulk and packaged materials as well as parts in process of manufacture. A request on your business letterhead will speed a copy to you.

CONVERTED TO COAL? If not, let G-W engineers show you how to convert quickly for little money.

DRYING AND BAKING METAL FINISHES? If you still use ovens, let G-W show you how to cut production time 75% and space 50% with an Infra-Red system.

GIFFORD-WOOD CO.

FOUNDED 1814

420 Lexington Avenue
New York

HUDSON, N. Y.

565 W. Washington Street
Chicago

Ash Spouts • Barge Unloading • Bins • Boiler House Equipment • Buckets • Bunkers • Carriers • Chutes
Conveyors • Crushers • Elevators • Feeders • Gates • Ground Storage Systems • Hoists • Hoppers
Infra-Red Drying Systems • Screens • Silo Storage Plants • Tanks • Weigh Larries 3665

(*Continued from page B-144*)

Causes:
Lack of paint

WINDOW FRAMES, Steel

Faults and defects to look for:
Leakage around frame
Rust

Causes:
Improperly calked, no paint

WINDOW FRAMES, Wood

Faults and defects to look for:
Leakage around frames
Rotting

Causes:
Improperly calked, no paint

Modernization

During these war days it is impossible to modernize in the strict sense of the word. The WPB has placed limits on maintenance and improvements. However, there are still some steps that can be taken, and in fact a few that must be taken.

Restrooms

Many plants are employing women for the first time. These women must be provided with restrooms, washrooms, and toilet facilities. In some plants this means the closing off of a suitable area and equipping the area with the needed facilities. There are wooden toilet compartments, wood lockers, composition reflector fluorescent lighting fixtures, and cast iron and plastic fittings available. These must be used to supply all needed additions, whether because of increased personnel or employment of women.

Additional toilet and washroom facilities are being tucked into all sorts of places. Ventilation and heat are frequently required in such added rooms. Unit heaters made with a minimum of critical material are available. Building changes, stairs, walls, and partitions for these additional rooms can usually be constructed of non-critical materials.

Lighting

Increased hours of work, increased numbers of machines, and detailed inspection call for excellent lighting. The fluorescent fixture is a good answer to many of these problems. These fixtures are now supplied with non-metallic reflectors and offer con-

CONSERVE VALUABLE PLUMBING FIXTURES

CUT MAINTENANCE COSTS 2/3

DON'T YANK OUT OLD, WORN, LEAKY FAUCETS!

Now you can re-form their rough, scored seats into smooth, round, precision surfaces, saving costly replacements and helping conserve valuable materials.

This 'Sexauer' patented Precision Tool, used by plant engineers and master plumbers throughout the country, is guaranteed to re-form them better than when new. Thousands of these tools are in daily use from coast to coast, restoring discarded faucets to long and useful service.

HOLD FAUCET REPAIRS TO A MINIMUM!

After re-forming faucet seats, install 'Sexauer' patented EASY-TITE Washers. This new laboratory triumph is a resilient, synthetic compound, neither fibre nor rubber which withstands the softening, disintegrating effect of extreme water temperatures (upwards of 300°F.).

Fabric-reinforced like a tire to prevent splitting and mushing out of shape, EASY-TITES outlast half-a-dozen ordinary faucet washers.

MR. WALTER SPIES,
Chief Engineer of National Can Corporation, says:

'Show me an efficient plumbing system and I'll show you an efficient factory."

YOUR PLUMBING FIXTURES ARE IRREPLACEABLE!

FORESTALL PLUMBING BREAKDOWNS WITH PATENTED 'SEXAUER' PRECISION TOOLS AND 'SEXAUER' TRIPLE-WEAR REPLACEMENT PARTS

Leaky, unsanitary toilets, faucets, pipes and fixtures, cause tremendous damage, waste water and the fuel required to heat it—impair workers' health, morale and output.

'Sexauer-ize' (safeguard) *your* vital plumbing system. While you slash your maintenance overhead you'll also reduce your water, fuel and power bills—save hard-to-get replacements, achieve the efficient, sanitary service every factory requires today.

THE 'SEXAUER' LINE

The Sexauer Mfg. Co., Inc., through more than 20 years, has developed *over 1,000* highly specialized parts for *better* plumbing maintenance and *longer* care-free service. They're listed in the big new 'Sexauer' catalog — 64 well-illustrated pages of time- and money-saving parts and equipment. *Order your free copy* of this valuable book TODAY.

'SEXAUER' SERVICE

There's a trained 'Sexauer' Technician in your vicinity, ready to consult with you on stocking the correct replacement parts, no matter what style of plumbing fixtures are in your plant. It will pay you to send for him without delay.

sexauer

J. A. SEXAUER MFG. CO., INC.
Dept. F4, 2503-5 Third Avenue, New York City

"SPECIALISTS IN PLUMBING MAINTENANCE MATERIALS FOR OVER 20 YEARS"

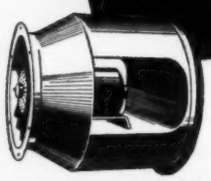
FOR MODERN PLUMBING CONTROL — MAIL THIS COUPON NOW!

Sexauer Mfg. Co., Inc., Dept. F-4
2503-5 Third Ave., New York City

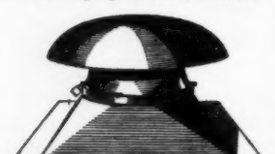
Send your nearest Technician with latest 'Sexauer' catalog and samples—also details of the 'SEXAUER-SYSTEM', a skillfully organized portable Kit of Precision Tools and 1,326 Triple-Wear Replacement Parts for efficient, one-trip repairs as advertised in THE SATURDAY EVENING POST.

COMPANY.....
INDIVIDUAL.....TITLE.....
ADDRESS.....
CITY.....STATE.....
Best Hour to Call.....

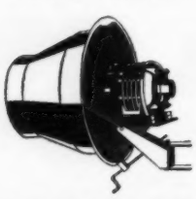
Make a place for the
DeBothezat
VENTILATING MAN
right from the start



For conveying corrosive fumes



Power-Flow roof ventilators



"HY-V" air jet man coolers

For general ventilation

"To do a thing right, start right." So when you have a project that requires ventilation of any kind, don't hesitate, get a highly trained DeBothezat Ventilation Engineer to assist you in working out the details. His knowledge of ventilating problems may point the way to saving in time and money. He is backed up by a complete line of DeBothezat ventilating equipment which is designed around the original Axial-Flow fan. Axial-Flow fans offer the following advantages: Guaranteed air delivery; non-overloading power characteristic; savings in space, weight and power; efficient operation against resistance of duct systems. If your requirements call for specialized equipment, the DeBothezat Research Department will gladly assist in its development.

ARMY E NAVY

De Bothezat
VENTILATING EQUIPMENT

DIVISION OF AMERICAN MACHINE AND METALS, INC., EAST MOLINE, ILLINOIS

siderably more illumination for the same current consumption than the familiar incandescent unit. Overloaded circuit conditions can be improved or prevented by the installation of fluorescent fixtures in place of incandescent. Extensive rewiring is frequently made unnecessary by the use of fluorescent fixtures. Fluorescent units are available in a wide variety of sizes, number of tubes, portable units, and methods of hanging. New ballasts take care of as many as four tubes with one ballast.

Mercury lamps are suitable where high-bay lighting is required, and yield high intensities. Incandescent fixtures are still available for this type of service.

Additions and changes to production lines frequently require revamping of the lighting arrangement. When re-wiring is required, special wires with new types of insulation, fixtures, switches, and other materials are available. Attractive and efficient fixtures may be obtained.

Guard Houses

Guard houses, employees' inspection houses, and entrance-ways need modernizing from the standpoint of convenience. Space is frequently a major requirement, and this can now be added without the use of critical materials, except for some needed wiring and piping. Guard houses requiring a minimum of labor for assembly are offered on the market. Additional time-card and checking facilities are needed to care for the larger number of employees, and many plants find themselves hampered for space for the rapid checking of ingoing and outgoing employees. Small additions to buildings or extending this space in existing buildings is a worth-while step.

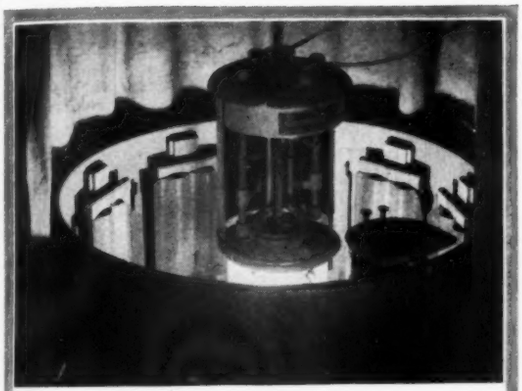
First Aid Rooms

Entirely new or enlarged first aid facilities are required in many plants. Be sure that these facilities are modern and of adequate size. Where such first aid rooms have not been in use, it is necessary to partition off the adequate space, and install proper plumbing and all other equipment. Where first aid facilities have been in service, it may be necessary to enlarge the space occupied or to establish new facilities at other locations. Here again plumbing is required in addition to the other needs of a first aid room or hospital.

The equipment needed in the average first aid room varies so much that no attempt is made here to outline the basic needs. The size of the organization and the type of

Weather-Tested

against { HEAT, MOISTURE, COLD, ACID FUMES



WEATHER-TESTED FOR EXTREMES — Here, in the Weather-Ometer, A P S panels were exposed to arc-light at temperatures up to 140°F., and then tested in cold-box at 10°F. below zero!

1 **Steel protects the structure**

2 *Weather-Tested* **compound protects the steel**

3 **Mica protects and reinforces the** *Weather-Tested* **compound**

APS

ROOFING • SIDING • FLASHINGS

The wide acceptance of A P S Roofing, Siding and Flashings is indicated by the number of outstanding industrial plants that have specified them repeatedly for use on their buildings.

Available NOW! for MAINTENANCE and REPAIRS ...as well as new construction

A P S Sheets are manufactured by a carefully controlled process in which the heated sheet is coated with a molten plastic compound and impregnated with mica for added protection.

A P S Sheets are available through your local jobbers

PROTECTED STEEL PRODUCTS CO.

General Office and Plant, WASHINGTON, PA.

MORE EFFICIENT MAN-HOURS with MUSIC

HERE'S WHAT WAR PLANTS REPORT

REDUCED FATIGUE
LESS "REJECTS"
FEWER ACCIDENTS

IF the manpower problem has you "over a barrel," send for free folio showing how Operadio Plant-Broadcasting systems maintain or *increase* production, even with a reduced number of workers or a high percentage of new and untrained personnel! Read surprising facts and figures of actual results.

Free folio tells how music scientifically selected for fatigue relief helps speed vital war production, reduces "rejects" and spoilage, lessens absenteeism and accidents. Learn about this remarkable relationship of music to manpower—how output is increased on production lines thought to be operating at peak efficiency!

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φ, *symbol of electronic excellence*, has identified Operadio products through 25 years of electronic research. Operadio systems are doing essential jobs at Wright Aeronautical Corp., Washington National Airport, U. S. Navy Yards and Training Stations, war plants everywhere.

WRITE OR WIRE TODAY for *free folio* showing how Operadio voice-paging and music can speed *your* production, help get material to the fighting front faster!

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accidents occurring in that organization govern to some extent the facilities to be provided.

Weather Stripping

The weather stripping of windows and doors is usually a money-saving program. It is a desirable step for all plants when the saving of fuel is important. This modernization step will stop drafts, reduce heat loss, and eliminate window rattle.

Application of sound-deadening materials to ceilings of offices, laboratories, inspection departments, and other suitable places will greatly improve the working conditions in these rooms. There are many soundproofing substances on the non-critical list, and most of them can be applied over existing ceilings with a minimum of disturbance to ceiling supported equipment of all types.

Painting

A real job of modernization can be performed by the application of paint. Many manufacturing buildings have never been painted. Or, if they have, the paint is dirty and blackened to the point where the reflective value is nil. The illumination on work and the attractiveness of the building itself may be greatly enhanced by the application of light-colored paints to the walls and ceilings. Ceilings are usually the worst offenders, and a coat of clean, white paint removes the "oppressive burden" of the ceiling from the shoulders of the workers. Light paint on walls and other dark surfaces further increases the illumination and attractiveness of the working areas.

One organization is in the process of doing such a painting job. A large department has been completely repainted and literally turned from black to white. The contrast between this newly painted section and dingy, unpainted departments is outstanding. The plant operators state that the increase in production rate in the repainted section is nearly 25 percent, and that the number of rejects was reduced to nearly one-half. Paint was the only change that has been made in this department.

This over-all painting is a desirable activity at any time and should include not only walls and ceilings, but also all piping, metallic structural items, wood surfaces, and all exposed surfaces where weathering can in any way affect the surface. It is a part of the normal maintenance procedure, but is included in this modernization discussion because of its extreme importance and the common tendency to "let it go."

Control of the Air Starts Here!

So that American warplanes can control the air above the battle fronts, American manufacturers are controlling the air *on the production fronts.* That holds true in the production of all kinds of precision equipment where extremely close tolerances are musts. Parts that pass inspection today can be out several ten thousandths of an inch tomorrow, due to a 15 degree change in temperature.

To speed up production . . . to reduce rejections . . . to prevent the damages of rust, dust, and corrosion . . . the air conditioning equipment for your plant must be *precision-fitted to the need of your plant.*

Seldom are two air conditioning problems identical. For that reason, Fairbanks-Morse maintains branch offices throughout the country, with resident staffs of engineers at each branch. You will find the resident engineer in your community the man with whom to talk. He is familiar with your local conditions and his judgment is not limited by a restricted line. The F-M line is *complete.* To meet him, write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.

Have you heard about F-M TIP COOLERS for spot welders?

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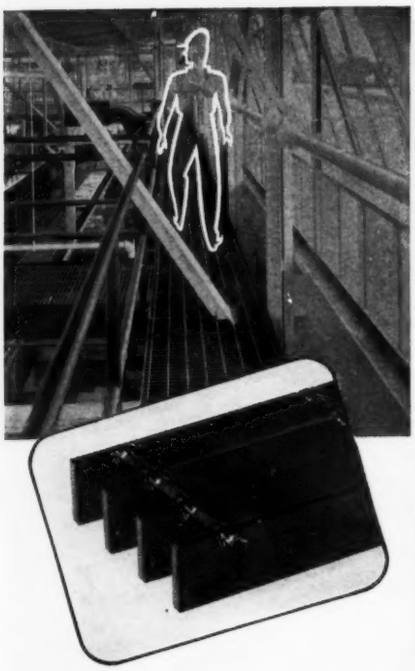

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That BATES fillet weld gives you the full strength of the original steel of main and cross bars, *without dirt-catching overflow of surplus metal around the fillet.* That's important.

Just as important, note that crisp, clean tread the entire length of cross bar—a feature you can get only with BATES Hex Cross Bar construction.

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–1–

ABSENTEE RECORDER—A dynamic recorder incorporating the use of six colors, forceful illustrations and easily manipulated slide which provide the mechanics for a competitive game between departments within a plant to reduce inexcusable absenteeism, is described in the new booklet, "A.W.O.L." Illustrations of the recorder, various "awards" for poor and good records, in addition to a description of the instructions which accompany both the regular and jumbo recorders, price lists, are included in this unusual booklet. Regent Specialties, Inc.

–2–

AIR CONDITIONING—Units for any air conditioning need: cooling only, heating only, or year-round control of temperature and humidity, described in complete detail with physical data charts, dimensions, etc. in Bulletin 107. Compact installation for factory, office or laboratory. Unit heaters with Syncrotherm Controls are detailed in Bulletin 103. Clarage Fan Co.

–3–

AIR CONDITIONING AND INDUSTRIAL REFRIGERATION—This 20-page booklet, covering air conditioning and industrial refrigeration for wartime use, outlines the basic uses of these aids to speeding and improving production. A very interesting and informative chart is used to point out uses of the equipment described in the booklet, No. 3–AC–0201. Westinghouse Electric and Mfg. Co.

–4–

ASPHALT PROTECTED STEEL—Literature fully describes this construction material and the method of manufacturing. Gives a uniformly thick coating which is resistant to weather, acid fumes, and acid gases. Gives tables of sizes of both corrugated and flat sheets. Protected Steel Products Co.

–5–

AUTOMATIC CONTROLS — Automatic controls equipped with hermetically sealed mercury switches for heating, air conditioning, refrigeration and various other industrial applications, are completely described in the 60-page Catalog No. 600. The complete line is shown with full specifications and details, prices, ordering in formation, dimensional drawings and convenient temperature conversion table. The Mercoid Corporation.

–6–

BLAST CURTAINS—How to protect personnel and vital equipment when bombs burst in the immediate vicinity constitutes the contents of Bulletin 0935. Installation photographs and drawings show how these blast curtains appear in use. Full specifications and engineering service of the manufacturer are also included. Cyclone Fence Co.

–7–

BUSBAR DUCT—This 76-page Bulletin No. 427 is in reality a very complete handbook on the enclosed busbar method of electrical distribution for industrial plants. It should prove highly useful for its general descriptions and

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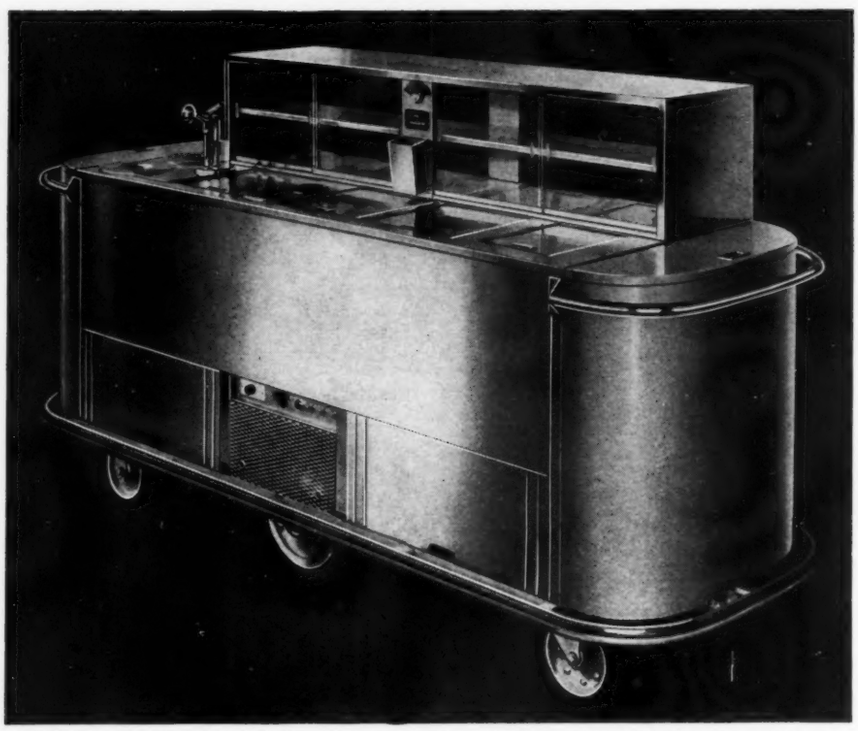

This Model C-1030 Ideal Rolling Cafeteria serves all hot and cold foods and, when not in active use constitutes a perfect storage unit, keeping foods hot or cold as desired

● Because it saves and extends the most valuable things in factory operation today, food service by Ideal Rolling Cafeterias is the accepted and approved method of feeding workers in war industries.

Bringing the food to the worker in the Rolling Cafeteria saves time, avoids confusion, reduces accident risk, keeps manpower at the peak of efficiency, promotes morale, saves floor space and cuts out food waste.

Not merely a glorified candy-wagon but a complete mobile equipment for serving and storing all hot and cold foods. There are many standard models meeting every requirement.

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illustrations of basic design, methods of estimating and layouts, symbols for layout men and estimators, suggested hanger arrangements, technical information and construction details, application data and typical specifications. Bulldog Electric Products Co.

–8–

CAST IRON PLUMBING TRIMMINGS–The new Bulletin No. AD1524 which covers cast iron plumbing trimmings conforming to War Department Specification PE-623, includes both illustrations and descriptions of these fixtures using non-critical materials. More than 60 specific items used in industry are included. Crane Co.

–9–

CIRCUIT BREAKER PANELBOARDS–This 16-page Bulletin completely describes both A. C. Circuit Breakers, Fuse type and a combination of both types. Basic wiring diagrams and features are shown with full specifications. Frank Adam Electric Co.

–10–

COMPRESSORS–Design 9 centrifugal compressors–available in more than 200 sizes, with pressures from ½ to 3 pounds, volumes up to 5500 c.f.m.–are discussed in 20-page Catalog 386–2. Performance tables, dimension diagrams, unit and installation photographs are shown, and a list of sales engineering offices is included. B. F. Sturtevant Co.

–11–

CONNECTORS, CONDUIT AND CABLE FITTINGS–The complete line of pressure (solderless) connectors, conduit and cable fittings is fully covered in Catalog No. 44 comprising more than 356 pages of descriptions of specific items, dimensions and dimensional drawings, technical data and other helpful information. This catalog is thumb-indexed into 20 sections with pictorial, alphabetical and numerical indexes in addition to a handy price list reference. The Thomas & Betts Co., Inc.

–12–

CONTINUOUS FLOW CONVEYERS–The 17 types of Mathews conveyers to effect the continuous flow of materials in production well illustrated and described in a 32-page catalog. Many photographs of interesting installations in varied industries appear in the book, which also gives distinctive features of the product. Mathews Conveyer Co.

–13–

CONTROL MANUAL FOR HEATING, VENTILATING AND AIR CONDITIONING–Very complete 232-page manual including sections on Control Circuits, Theory of Air Conditioning, Typical and Standard Control Systems, Zone Control, Typical Specifications and Engineering Data. This manual is actually a text book on Automatic Control for Industrial and Commercial Building. Minneapolis-Honeywell Regulator Co.

–14–

CONVEYORS–28-page book describes complete line of conveyors and conveying machinery. Blueprint drawings of 22 types of conveyors, with complete descriptions of each; schematic diagrams of typical belt conveyor arrangements. Many photographs of representative installations. Alvey-Ferguson Co.

There are no communication bottlenecks—you waste no vital time with an RCA Sound System on the job.

For "right-now" contact, RCA Sound Systems are giving literally lightning communication in hundreds of war industries.

With an RCA Sound System, you can not only locate and speak personally to executives, key men, maintenance men or visitors *anywhere* in your office or plant, but you can make direct announcements to your entire personnel in cases of air raids, fire alarm, police alarm and other emergencies.

Quite as important, RCA Sound Systems permit special program broadcasts—"live," radio, or recorded—during lunchtime and fatigue periods. Such programs have been found, by our war industries as well as the British, to promote morale and increase efficiency.

Regardless of the size of your organization, RCA Sound Equipment is so flexible and easily installed that our engineers would have no difficulty planning one for you. So far as cost is concerned, estimates made by industries using RCA equipment disclose that such systems pay for themselves many times over in increased production.

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Vital Helps to Industry's Needs

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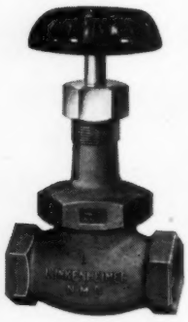

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Non-Metallic Disc
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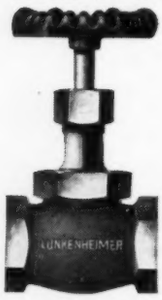

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Illustrated are a few of the many types of Lunkenheimer Valves helping to produce vitally needed equipment for the Army, Navy, Maritime Commission and Air Force and other war agencies.

They're part of the complete line of valves made by Lunkenheimer for every industrial process—of bronze, iron, steel and corrosion-resistant alloys—from tiny needle types to massive power-plant valves—for 125 to 2500 lb. S.P.

A further help is Lunkenheimer's nation-wide distribution through leading supply houses. Wherever there's war activity there's a Lunkenheimer distributor serving it. Ask for Catalog 78 and the Guide for selecting Valves.

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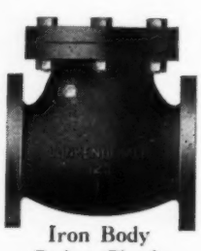

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–15–

CONVEYOR KEY BOOK—A guide to pro duction "step-ups" now possible with moder conveying. Shows time-and-effort savings i percentages, also actual dollar savings per yea Data backed by actual statements from user Profuse illustrations, including B-P plant la outs and sketches showing where, how an why different types of conveyors are used fo maximum results. Logan Co.

–16–

DUST ARRESTORS—In a new 8-page Bulle tin, "Mastery of the Air," the oval bag dus arrestors are completely described. This bulle tin contains technical data on the system o dust collections, mechanical data on th device, engineering information and construc tion diagram. Parsons Engineering Co.

–17–

DUST COLLECTORS—24-page bulleti (No. 903) on All Metal, Cloth Screen, Dus Collector. Describes the exclusive feature available for modern economical dust control Many large photographs, charts and drawing clearly illustrate the 14 outstanding points o superiority claimed for this dust collector Pangborn Corp.

–18–

DUST FILTERS—Small, inexpensive, flex ble units for many dust control and dust col lection problems are described in the new 4-page Bulletin No. 93. The units are fully il lustrated and described with complete engi neering specifications. Included, also, are ap plication data and detail drawings of the units W. W. Sly Manufacturing Co.

–19–

DUST IN INDUSTRY—24-page book deal with dust control problems and their solu tion. Text, large photographs, drawings an fractional efficiency graphs show the feature and advantages of the Van Tongeren system Typical installations and applications, labora tory views. Buell Engineering Co., Inc.

–20–

ELECTRIC HOISTS AND CRANES—Tw comprehensive bulletins contain specifications ratings, construction, clearance dimensions o small electric hoists and motor driven trolley for propelling hoists along tracks. Robbins & Myers, Inc.

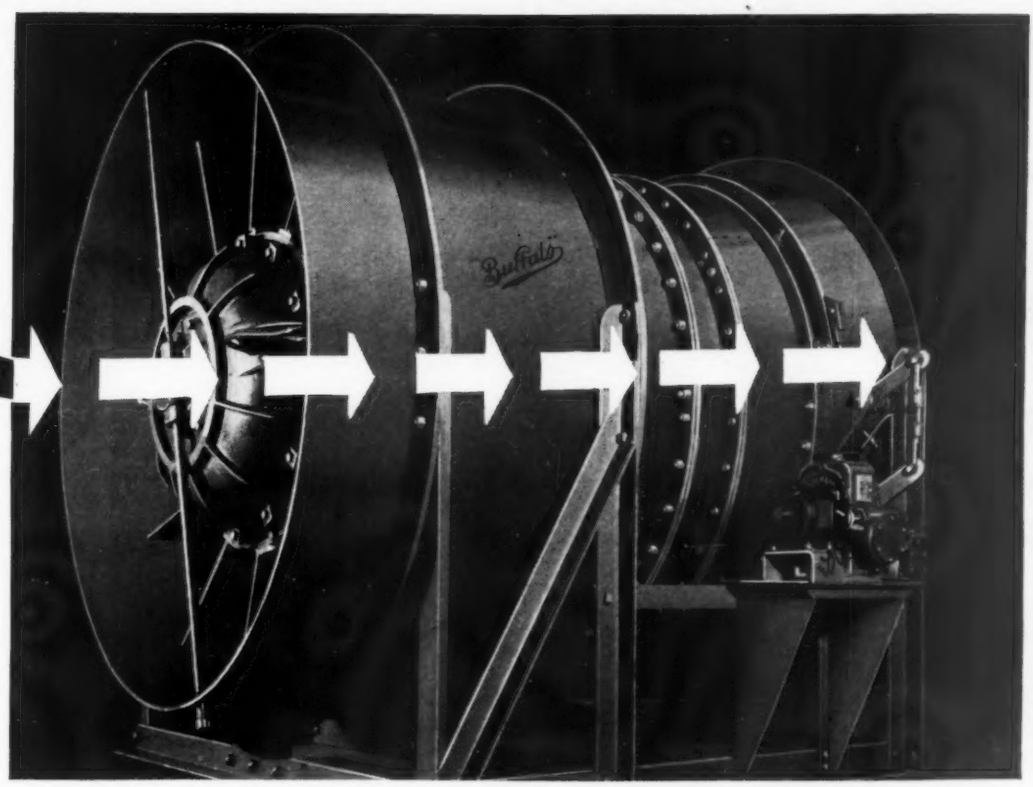
–21–

ELECTRIC SWITCHES—A complete lin of electric switches, insulated system device and wire connectors, surface wiring device are included in descriptive Sheets 73- to 76-D More than 64 specific items, fully describe and illustrated are included along with wirin information and 15 wiring diagrams. Th Bryant Electric Co.

–22–

ELECTRICAL CONDUIT AND DRAIN PIPING—Conduit for underground distribu tion of electrical services and for underfloo raceway distribution of power and communi cations in all types of buildings are describe in this 12-page bulletin, "Orangeburg Fibre Conduit". Fully covered are the various applications of fibre piping for drainage where tight joints are necessary, for many waste that are corrosive to metal or concrete pipe, for connections to sewers and septic tanks

AIR TAKES THE *Straightaway*



In power-saving... "Buf-flow" AXIAL FLOW FANS

The "straightaway" flow of air through a "Buf-flow" Axial Flow Fan—plus the non-rotating movement of the air current as it leaves the outlet—explains both the efficiency and the power-saving features of this Buffalo-developed design. The wasted motion of air turbulence is reduced to a minimum by means of special directional guide vanes, thus preventing losses common in ordinary propeller fan. The result is an exceptionally high capacity operating against pressure losses, quieter operation, marked power savings. These advantages—plus the sturdy, durable construction and the non-overloading characteristic—makes "Buf-flow" Axial Flow Fans unexcelled for air handling problems.

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BOOST WAR PRODUCTION
With More Fresh Air!

Is production lagging at some critical point? Perhaps the air is bad. Let Allen Ventilation engineers inspect and report. If better ventilation is required, Allen provides wide choice of equipment of many proved types, — including wind-driven, power-operated, and stationary.

This is the Allen
"MAN-COOLER"

A rugged, portable fan of great power, designed specifically for industrial uses. Ideal for "hot spots" in forge plants, foundries, boiler rooms, any place where conditions are tough. Propeller design provides a close directional control of air blast.

Send for detailed literature of this "Man-Cooler" Fan and other Allen equipment. Let ALLENS clear your atmosphere for maximum production of war materials. Phone or wire factory if need is urgent. Representatives in most principal cities.

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9763 Erwin Ave. • Detroit, Mich.

Speed Sweep Brushes

FOR FASTER, CLEANER EASIER SWEEPING

No. 411-14"
$1.95 EACH
LOTS OF 12

Wire-drawn tufts.
Adjustable handle.
Highest grade bassine fibre.
Narrow light weight block with Pressed Steel back.

Heavy Duty "Speed Sweep"—the ideal brush for heavy work through grease, cutting oils, metal filings, etc. High grade bassine tufts are compact and trimmed for "spring and snap action." Study its unique construction, and you'll understand why it does a better sweeping job in less time and with less work.

Double Duty "Speed Sweep" handles fine dust as well as heavy dirt. Two center rows of tufts are of heavy bassine to handle rough dirt while the outside rows are finer Union fibre to control fine dust particles. The general construction of Double Duty Speed Sweep brushes is identical to that of the Heavy Duty Speed Sweep.

Heavy Duty "Speed Sweep" Prices				Double Duty "Speed Sweep" Prices			
Size	6	12	24	Size	6	12	24
No. 410—12"	$2.25	$1.80	$1.60	No. 420—12"	$2.35	$1.95	$1.75
No. 411—14"	2.35	1.95	1.75	No. 421—14"	2.55	2.15	1.95
No. 412—16"	2.50	2.10	1.90	No. 422—16"	2.75	2.35	2.15
No. 413—18"	2.60	2.20	2.00	No. 423—18"	3.00	2.55	2.35
No. 414—20"	2.75	2.35	2.15	No. 424—20"	3.15	2.75	2.50
No. 416—24"	3.15	2.70	2.50	No. 426—24"	3.45	3.05	2.80

All brushes have 5¼" trim. Prices are f. o. b. Milwaukee

Speed Sweep brushes have been proved by so many firms and under such varied conditions that they are sold with an unconditional guarantee to meet your requirements. Full credit if you return brushes within 10 days. Order today. Shipment will be made promptly if you supply at least an A-10 rating and End Use symbols.

MILWAUKEE DUSTLESS BRUSH CO., 526 N. 22nd St., Milwaukee, Wis.

drain pipes, irrigation and subsoil drainage, for downspouts, leaders and vent pipes. The Fibre Conduit Co.

–23–

ELECTRICAL PRODUCTS—The complete line of electrical products is illustrated and described in the Catalog No. 5. Included in this 60-page, quick reference listing are safety switches, klutch klips, toggle switches, meter service and entrance switches, troughs for socket meters, multi-breakers, industrial control equipment, circuit breakers, fuse boxes and fittings, fuses, clips and lugs, as well as application data, comprehensive technical information and prices. Colt's Patent Fire Arms Mfg. Company.

–24–

ELECTRONIC DEVICES – Descriptive sheets illustrate smoke alarm and combustion control, outside traffic or within-plant traffic counter, beacon or signal light operating, oil burner control, light and welding timing control devices. Electronic Products Company.

–25–

EMERY AGGREGATE—A long lasting, non-slip flooring for industrial purposes is the subject of the new 12-page Bulletin No. 142 on Cortland Emery Aggregate. Engineering information and technical data on the high compression strength and high tensile strength of the material supplements the application photographs and other helpful information. Walter Maguire Company, Inc.

–26–

FANS—"Lively Air is Essential to Health" is the title of this 20-page booklet, 2FN-2401. The effects of stale air on the human body are discussed and illustrated by the cartoon method. A special chart depicts the advantages of "Lively Air" in a variety of industrial applications. Diagrammatic illustrations of typical fan installations as well as other technical information. Westinghouse Elec. & Mfg. Co.

–27–

FENCES—A complete line of protective fencing illustrating and describing 14 different types of chain link fencing for industrial purposes, included in Catalog No. 110. Anchor Post Fence Company.

–28–

FENCES—32-pages of valuable material on fences of all types, is the subect of the booklet "Your Fence—How to Choose it, How to Use it". Helpful information on how to determine fence quality and complete details of the line of fences are included with instructions on drawing fence diagrams. The free fence engineering service is also described. Cyclone Fence Co.

–29–

FIBERDUCT—In this 36-page Bulletin No. 53-212-1 is described G-E Fiberduct—an underfloor raceway system especially suited for industrial buildings. Technical information in addition to complete descriptions of Fiberduct and the various fittings, tools, etc. is included. One section of the bulletin is devoted to layout design procedure, methods of installation and Rotometer conversion table. Electrical symbols for architectural plans are also included. General Electric Co.

–30–

FIRE EQUIPMENT – "C-O-Two" carbon dioxide type portable, mobile and stationary fire equipment is described in a new booklet recently issued. Information on hand and wheeled fire extinguishers, hose units, crash trucks, manual and automatic extinguishing systems and automatic smoke detecting systems is supplemented by illustrations of installations protecting widely diversified occupancies. C-O-Two Fire Equipment Co.

–31–

FIRE PROTECTION–How engineered automatic fire protection can be provided for any industrial plant is described in new, 8-page bulletin. Full description of system and its component parts. New 4-page bulletin describes fire extinguishing systems for Quench Tanks. Cardox Corporation.

–32–

FLOOR GRATING, STAIR TREADS, FLOOR ARMOR, BRIDGE DECKING–Specific information on the "whys and wherefores" of electrically pressure welded floor grating, stair treads, floor armor and bridge decking, are illustrated and described in the 12-page Catalog No. 937. Safe loads Table, specifications and other engineering data accompany the interesting photographs showing alignment of grates in service. Walter Bates Co.

–33–

FLOOR MACHINES & VACUUM CLEANERS–The full line of floor machines for modern floor maintenance is described in bulletin No. 3QD. Full specifications, accessories and uses for these devices are described. Bulletin No. J405B describes and illustrates floor suctions and also includes many application photographs, specifications and other useful data. Two specific models of floor machines–one for normal commercial duty and the other for medium duty–are covered by two other bulletins. The Kent Co., Inc.

–34–

FLOOR MAINTENANCE–The maintenance of floors of all types is the subject of this 48-page bulletin entitled "Modern Maintenance." Not only are the various floor maintenance practices described, but the many products which fit these needs are also covered. Other sanitation equipment such as liquid soap systems, etc. are described in addition to roof and exterior protection materials, floor scrubbing and polishing machines. Hillyard Chemical Co.

–35–

FLOOR SCRUBBER-DRIER–A gasoline powered floor scrubber-drier is described in bulletin on Model 215-G. Supplied with a gasoline tank sufficient for 4 to 5 hours operation, this device speeds floor scrubbing and drying in industrial plants of all types. Full specifications and details about the machine including cleaning capacity in both congested and open areas, is included in this bulletin. Finnell System, Inc.

–36–

FLOORS–A new type of light-reflecting floor installed in aircraft plants is described in new 24 page book "Light From Floors Speeds War Production". Quick facts on light reflecting floors and related data in addition to section of recommended practice for construc-

Don't give enemy agents a chance!

. . Screen all windows

To guard the nation's war production from vicious acts of saboteurs, every effort must be made to keep them from gaining access to war plants. You can help, by plugging all "holes" in your plant where they might sneak in. Screen all windows, especially those facing sidewalks or parking lots, with a good, strong steel mesh. It prevents breaking into the plant—and it eliminates the possibility of having tools, plans or blueprints tossed outside to a confederate.

. . Fence all parking areas

When parking areas are enclosed with fence, employees must pass through pedestrian entrances. Thus a complete checkup can be made of any packages carried to or from workers' cars. Not only the plant itself—but all vital areas, such as power controls or transformers, should be enclosed with high fence—preferably with a barbed wire top.

. . put Gates over spur tracks

Don't leave a single place open or unguarded. Put gates over spur tracks —fence over storm sewers. Be sure there is no possible place of entry that can not be locked or guarded day and night.

If you need fence or wire mesh, call us. Demands are heavy, supplies limited. But if you have proper priorities we can take care of your needs. We'll help you choose the right materials and give you a free estimate. For further information clip the coupon below for our free book on fence.

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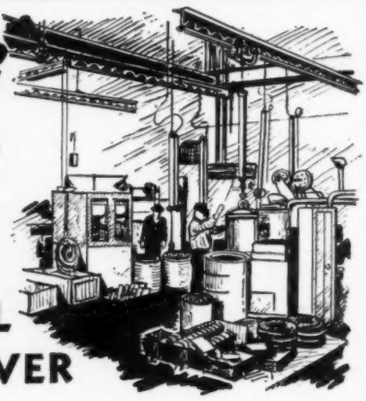

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It actually penetrates the pores of metal, wood or concrete—inhibits hidden rust and corrosion—expels moisture and oxygen, the active agents causing rust.

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Your overcrowded war-busy factory buildings need more ventilation—to give workers a better chance to produce at capacity. Get quick relief with this efficient, economical, easy-to-install ventilator. As wide as your roof, if you need it, but never more than 32" high.

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tion, surface treatment and maintenance. Universal Atlas Cement Company.

–37–

FLOORING, ROOF, SIDING—These are the subjects of two bulletins. Manual 606 contains 16 pages devoted to asbestos cement roofing and siding and flat asbestos products. Complete technical data, flashing methods, wall construction, sheathing are typical of its contents. Bulletin No. 4889 is devoted to Elastite flooring. Technical data includes full description of the material, its recommended uses, chemical conditions, preparation of subfloors, preparation of materials, equipment required, instructions for general application. The Philip Carey Co.

–38–

FLUORESCENT ACCESSORIES—This 16-page Bulletin No. 57–28 contains a vast amount of helpful information on Fluorescent lighting. Fluorescent lamp construction and operation, operation of the ballast, starter breakdown voltage, cathode-ray oscillograph test are typical of its contents. Illustrations and mounting dimensions. General Electric Co.

–39–

FLUORESCENT, INCANDESCENT, MERCURY-VAPOR and VAPOR-PROOF LIGHTING EQUIPMENT—10 sheet loose-leaf portfolio featuring 12 designs of fluorescent reflectors for industrial applications, 4 styles of reflectors for incandescent, mercury-vapor and vapor-proof uses in addition to the Guth line of incandescent lighting fixtures. Complete details and specifications on each item. The Edwin F. Guth Co.

–40–

FLUORESCENT LIGHTING – Fluorescent units for efficient wartime lighting which conserve strategic materials and yet conform to all RLM standards, are described in the new 4-page catalog 43-V. Illustrations of the units with full descriptions, specifications, dimensions and valuable lighting data are incorporated in this helpful catalog. Bright Light Reflector Company.

–41–

FLUORESCENT LIGHTING—The complete line of Fluorescent Fixtures with Non-Metallic Reflectors is adequately described in the new Bulletin No. 71. Full specifications and details on each unit, as well as fittings for continuous installations, are also included. Wheeler Reflector Company.

–42–

FLUSH VALVES—A flush valve that conserves critical war materials, meets War Department Specification PE-623, is described and illustrated in the new Bulletin No. 858-W. The design features of this flush valve, a simplified reference chart for selection of flush valves for U. S. Government projects and ordering information are included. Imperial Brass Mfg. Co.

–43–

FUSES—Full details about Super-Lag Renewable Fuses are completely described in Bulletin Rcs. How these fuses and fuse-links prevent needless "blows" and useless shut-downs, regardless of their size when properly selected for their load requirements are included in this bulletin. Complete technical

WIREMOLD

HELPED TO BUILD HER . . . AND

WIREMOLD HELPS HER FIGHT!

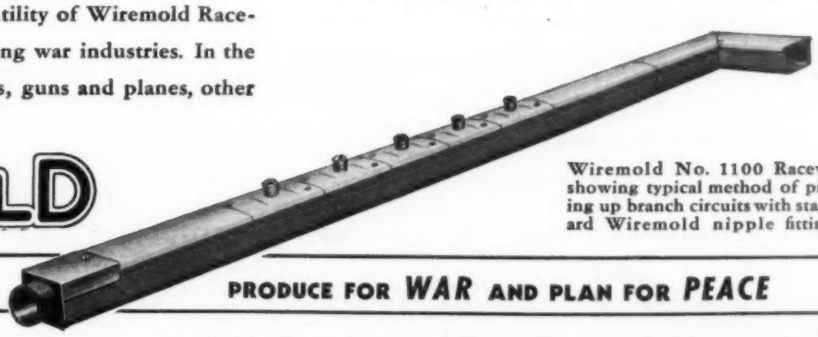
PHOTO: EWING GALLOWAY

YES, there's Wiremold in a tank . . . to contain the vital wiring circuits that keep her engines running and her electrical controls in operation.

Wiremold No. 1100 Raceway, with standard and special fittings, was selected for this war service and also for use on armored cars and gun carriers because of the PROTECTION afforded circuits run in this strong steel raceway . . . because of EASE and FLEXIBILITY in picking up branch circuits from the ends or intermediate points in the raceway . . . because individual circuits can be INSPECTED, REPAIRED or REPLACED quickly and easily without ripping out the entire wiring system . . . and because Wiremold Raceways aid in providing EFFECTIVE SHIELDING against radio interference.

This is just one of the many ways in which the time and material-saving utility of Wiremold Raceways and fittings are helping war industries. In the plants that produce tanks, guns and planes, other thousands of feet of Wiremold Raceways and Plugmold Plug-in-anywhere Bench Wiring save time and material in completing installation of urgently needed power and light circuits, and daily contribute to increased production by promoting greater operating efficiency.

Adequate supplies of Wiremold are immediately available from stock for essential industrial installations and for use in equipment for war service. Wiremold Engineers will welcome an opportunity to work with you in developing installation methods adapted to your special requirements. Write direct to The Wiremold Company, Hartford, Connecticut



Wiremold No. 1100 Raceway showing typical method of picking up branch circuits with standard Wiremold nipple fittings.

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CAN HELP YOU

PRODUCE FOR *WAR* AND PLAN FOR *PEACE*

"HELPING HAND" LITERATURE FOR CONTRACTORS AND PLANT OPERATORS

- ☐ Bulletin, "Wiremold Industrial System-Wiring Speeds War Production".
- ☐ Engineering Data Sheets, Plugmold Multi-Outlet Wiring Systems.
- ☐ Wiremold Catalog and Wiring Guide.
- ☐ Engineering Data Sheets No. "3000" System Wiring for Industrial plants.
- ☐ "Pancake" Wiremold Overfloor Wiring System for Office and factory.

CHECK and return with your name and address.

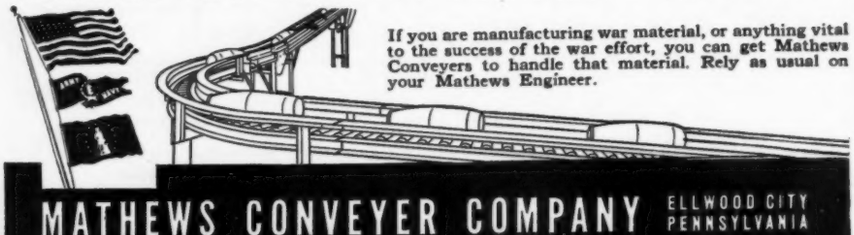
..and *Pass* THE AMMUNITION

PASSING AMMUNITION FASTER through production stages . . . speeding it into the hands of America's fighting forces . . . that's a Mathews Conveyer job for the duration!

In your plant, if there is any lag in moving materials to and from men or machines, perhaps a Mathews engineer could point the way to improving this condition.

Mathews Conveyers are available for critical war materials . . . there is no surer way to shorten the war than to speed Victory at its source!

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION



If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

MATHEWS CONVEYER COMPANY ELLWOOD CITY PENNSYLVANIA

details on overloading information. Bussmann Mfg. Co.

–44–

GAS WELDING TIP MAINTENANCE–2-page Special Service Report describes newly developed time-saving technique for cleaning and reconditioning brass or copper gas welding and flame cutting tips. Report gives detailed review of method. Tells how it not only restores tips to efficient operating condition by completely removing carbon, slag, scale and tarnish without injuring orifices, but also conserves manpower by eliminating need of scraping and brushing generally required heretofore on this maintenance work. Oakite Products, Inc.

–45–

GLASS BLOCK PARTITIONS–How to erect glass block partitions with prefabricated wood members is illustrated and described in the new bulletin IB45. The erection procedure is fully outlined in six successive stages. Application data and construction details are also included. Owens-Illinois Glass Co.

–46–

GRAVITY AND POWER CONVEYORS–50 applications of Standard conveyors in various industries handling packaged merchandise shown in 12-page illustrated bulletin. Also includes table to assist in selecting from the 17 different types of Standard handling equipment the ones best suited to individual handling problems. List of cities where there is Standard representation is included. Standard Conveyor Co.

–47–

HANDBOOK OF BUILDING MAINTENANCE–68-page, profusely illustrated handbook discusses materials and methods for maintaining and renewing floors, walls, roofs; damp and water-proofing; preserving and beautifying concrete and wood floors. Flexrock Company.

–48–

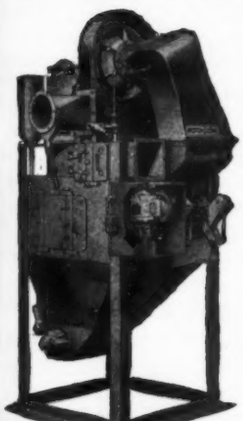
H. O.H WATER STUDIES–A 48-page booklet of treatises on steam and return system corrosion–how to get accurate chemical proportioning– refrigerating brines–how to read water–interesting cases of control of corrosion, making pipes and boilers last for the duration–how $25,000, in equipment was saved in one plant . . . and many other vital facts. D. W. Haering & Co., Inc.

–49–

HOW LIGHT CAN HELP YOU SPEED VICTORY–This 20-page pamphlet, Y-38, shows 7 ways improper lighting slows production; 13 case histories on increased production when lighting was improved. Five practical helps for elimination of bottlenecks and five lighting tricks through the use of special lighting tools. General Electric Co.

–50–

HOW TO TEACH FIRE FIGHTING–Prompt control of incipient fires depends on the ability of workers to handle fire-fighting equipment ably and intelligently. This calls for training. This new booklet gives complete instructions on how to run fire protection demonstrations, how demonstrations should be set up, how common types of extinguishers are used. Walter Kidde & Co., Inc.



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Dust, that saboteur of production, must be kept out of *every* plant if maximum efficiency and speed in production are to be achieved. Dust spoils materials in process—increases rejects—reduces worker productivity—and adds to maintenance costs. Most war production plants already know this—as proved by the fact that we delivered *over 3 times* the AAF dust control equipment last year as during any similar period in our history! If your plant has a troublesome or dangerous dust condition, it can be eliminated—by engineered dust control. Write us about your problem, and send for "AAF in Industry"—a new booklet describing the complete line of AAF equipment.

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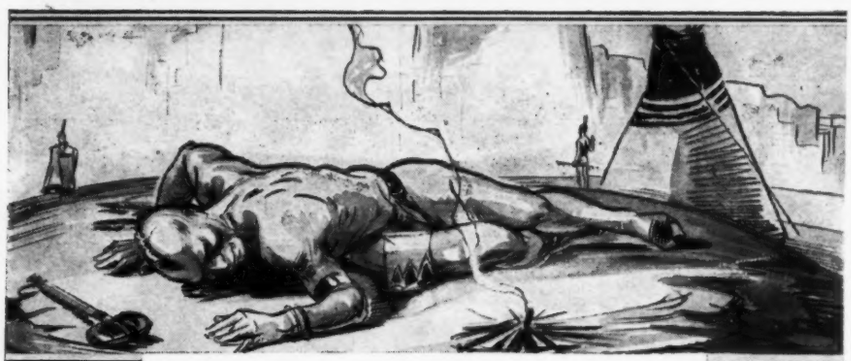

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FIXES FACTORY FLOORS WITHOUT STOPPING TRAFFIC!

★Repair dangerously broken floors this quick, easy way . . . with Spark-Proof, ready-mixed SPEED PATCH. Nothing to add—no mixing.

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Nothing is easier . . . nothing is faster . . . nothing is more durable. Think of it . . . Speed Patch repairs are made without interrupting regular operations.

Anyone can make Speed Patch repairs . . . expertly. Order today!

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–51–

INDUSTRIAL SYSTEM WIRING—"Wiremold System Wiring Speeds War Production," "Pancake Wiremold Overfloor Wiring Systems," Engineering Data Sheets, the complete Wiremold Catalog and Wiring Guide—all offer many time-saving, material-conserving and cost-reducing suggestions particularly valuable to war plant operators faced with the problem of extending or relocating lighting circuits . . . installing power wiring to production or test equipment . . . providing convenience outlets for power or light along work benches, assembly tables, inspection benches, etc. The Wiremold Co.

–52–

INDUSTRIAL TEST INSTRUMENTS—15 multi-range and multi-purpose test instruments ideally suited to industrial uses, are described in the 8-page Bulletin R-24-B. Various types of circuit testers, power level meters, tube checkers, vacuum tube voltmeters for electronic testing, and current transformers are covered by illustrations, range, accuracy, scale length and other technical information. Weston Electrical Instrument Corp.

–53–

INDUSTRIAL VACUUM CLEANERS—Bulletin No. 120 "Vacuum Cleaning A New Tool for Industry". A catalog with over 50 illustrations showing how vacuum cleaning is used in industrial plants. Complete description of both stationary installed systems and heavy duty portables available for this service. A ten-minute treatise on this important subject based on the experience of over 400 users. Spencer Turbine Co.

–54–

INFRA-RED RADIANT ENERGY – New Bulletin No. 150 illustrates application of Infra-Red Radiant Energy for the drying and baking of industrial finishes. Illustrations in this bulletin show the various steps required for product handling and sequence of operations. Listed are the advantages of using Radiant Energy as an agent for increasing production, and for obtaining better protective finishes. Gifford-Wood Company.

–55–

INSULATING BRICKS—Molded insulating bricks as back-up insulation for refractory brick in the service range up to 2000 degrees F. are described in Bulletin 1B-1. Where these bricks are not subjected to abrasion or abuse, they may be exposed to furnace interiors up to 1600 degrees F. Thermal curves, physical characteristics and other valuable technical data is included. Form Z-1 completely covers the "Z" crete system of insulating underground pipe. Universal Zonolite Insulation Co.

–56–

INSULATING CEMENT—No. 1 insulating cement, effective up to 1800 degrees F. is the subject of special 4-page folder. It discusses the composition of this insulating cement, how to apply it, its ease of storing in addition to table showing recommended thickness of application, high coverage, adhesiveness and elasticity. Baldwin-Hill Co.

–57–

INSULATION—Manual compiled of data sheets and divided into sections furnishes

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CUTS TWO WAYS!

PITTSBURGH'S "Glorified Light" Paints offer two separate and distinct savings:

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KENT CLEANING SYSTEMS

— Save Manhours of Labor
— Reduce Slippery Floor Hazards
— Speed Shop Traffic
— Improve Plant Health Conditions

No production tie-ups from cleaning when Kent Floor Machine and Electric Mopper is used. Floor at each machine can be scrubbed and suction dried by two man crew in *90 seconds or less.*

KENT FLOOR MACHINES

For **WET or DRY SCRUBBING**

Powerful, easy-to-operate wet or dry scrubbing machine quickly removes imbedded grease and dirt accumulations from all types of floors. Available in sizes for every plant need.

For **DRYING FLOORS**

KENT ELECTRIC MOPPERS

Faster than 3 men with hand mops, Kent Electric Moppers

1—Suction drys floors quickly
2—Decrease slippery floor hazards
3—Remove scrub water from inaccessible places
4—Reduce wood floor rotting and warping by removing water from cracks.

Kent Electric Moppers can be anywhere in production areas, warehouse office, laboratory and cafeterias. Write for complete information from men who have been floor cleaning specialists for years—

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technical information, engineering data, and tables; describes heat insulations, cold insulations, accessories and fireproofing materials, presealed insulated pipe, refractory cements, packings, building insulation and materials, asbestos fibres and textiles; and gives recommendations and specifications. Ehret Magnesia Mfg. Co.

–58–

LAMINATED ARCHES AND BEAMS—A construction material which has come into prominence due to the scarcity of steel, is presented in this 12-page catalog. Practically every conceivable shape and type of arch and beam, and practically every basic type of installation is shown with photographs, drawings, and suggestions for its practical application. Unit Structures, Inc.

–59–

LOCKERS, TOOL STORAGE, AND SHELVING—24-page Bulletin No. 233-G covers complete line of lockers for all purposes. Construction details and listing of sizes included. Tool Storage Bulletin No. 175-B illustrates and describes a wide variety of equipment available for industrial tool storage. Typical tool room layouts included. Standard shelving for all industrial applications is fully illustrated and described in 24-page Bulletin 120-F. Lyon Metal Products, Inc.

–60–

MAINTENANCE OF INSULATED WIRES AND CABLES—How to look after your insulated wires and cables is clearly illustrated on a wall chart No. 2026. It shows in easily understood pictures the 16 steps to take to protect wires and cables. Suitable for mounting on walls. The Okonite Company.

–61–

MASONRY CEMENT—This new 20-page bulletin on Brinxment contains much helpful information for building superintendents and maintenance departments. The many characteristics of this masonry cement are graphically portrayed along with actual tests. Included, also, is estimating data for mortar and stucco. Louisville Cement Company.

–62–

NEW MANUAL ON ROOFING WATERPROOFING—This reference manual for architects and engineers is complete in 70 pages, plastic bound, stiff covers. Six comprehensive sections contain specifications, procedure, and detail drawings for built-up flat and steep roofs, flashing and roof drainage, methods of installation, waterproofing and damp-proofing. Also data and photographs on asphalt shingles, asbestos-cement siding and roofing shingles. The Barrett Co.

–63–

OIL RECOVERY—The recovery of oil from machine chips is covered in this special 8-page Bulletin, "Tolhurst Chip Wringers." A complete description of this mechanical method of separating the oil from chips by centrifugal force, as well as illustration of the Chip Wringer, its dimensions and constructional details is also included in this informative bulletin. American Machine & Metals, Inc.

–64–

OVERHEAD CARRIERS—Stabilized overhead carriers which eliminate longitudinal,

Penco Wood Storage Equipment

- **Saves Time and Labor**
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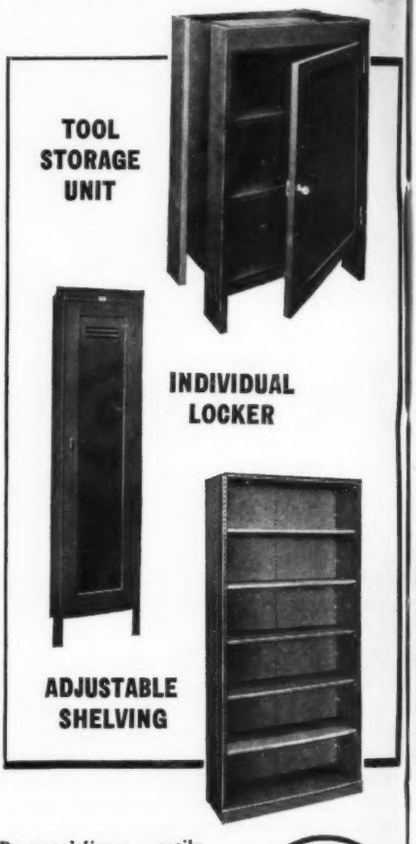
PENCO Wood Storage Equipment adequately fulfills emergency needs for storage and material handling equipment. It is the conservation substitute for PENCO Steel Lockers, Cabinets and Shelving.



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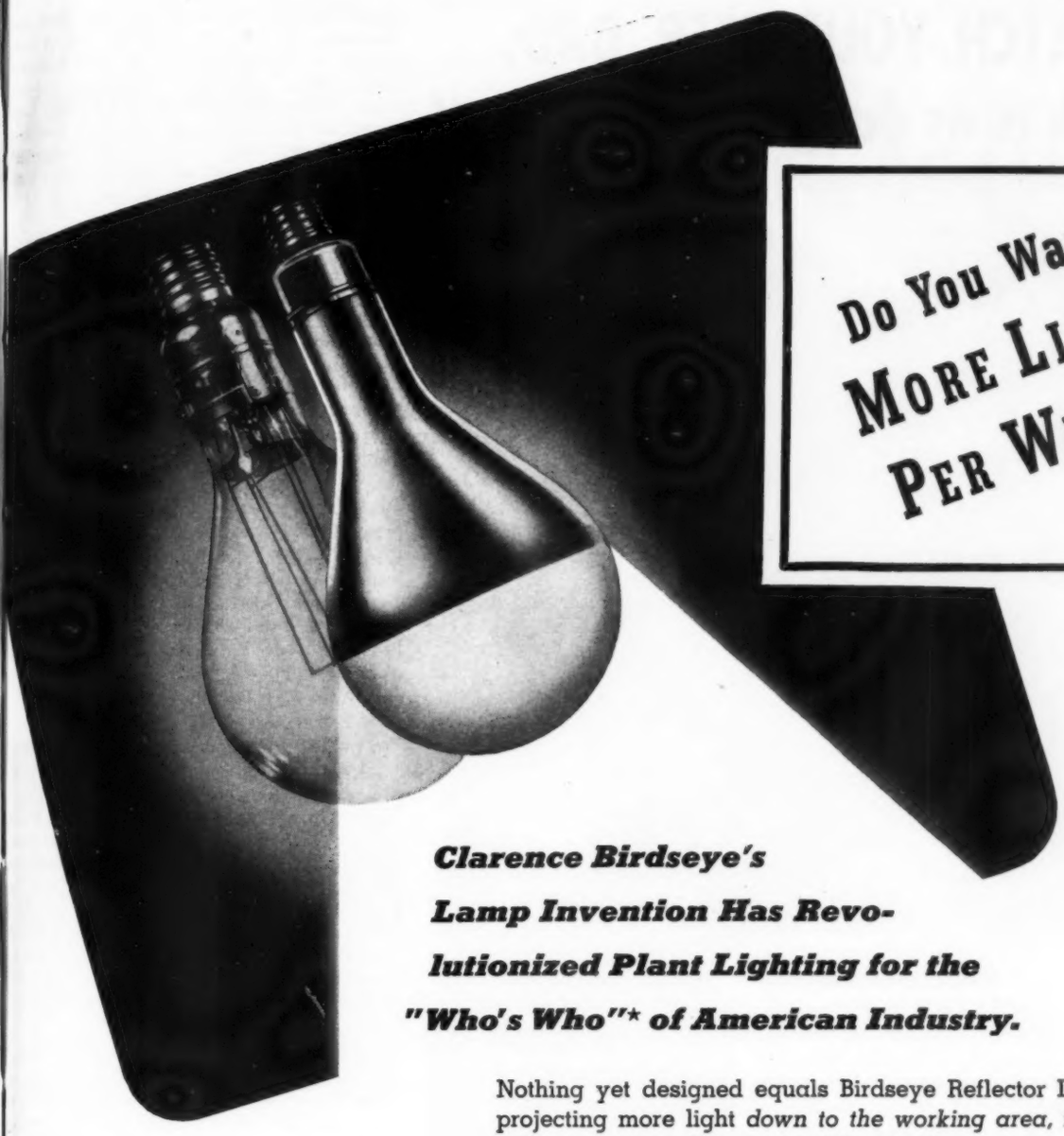

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Nothing yet designed equals Birdseye Reflector Lamps for projecting more light *down to the working area*, full force, without waste, without added line load.

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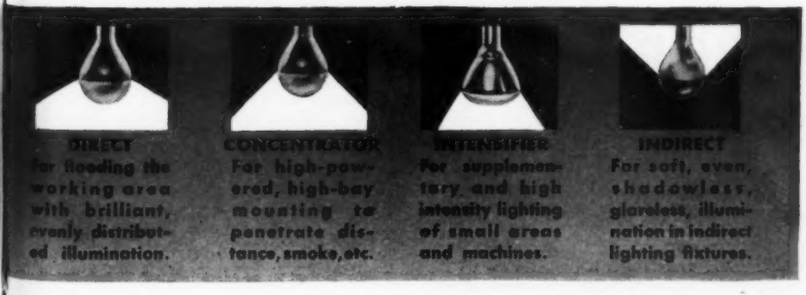
NO REFLECTORS NEEDED
Every Birdseye Reflector Lamp a COMPLETE luminaire lighting unit. No separate reflectors or fixtures needed.

SAVES EXPENSIVE MAINTENANCE
Birdseye's pure silver reflector lining is SEALED INSIDE to remain brilliant always — never needs cleaning.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For flooding the working area with brilliant, evenly distributed illumination.
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For high-powered, high-bay mounting to penetrate distance, smoke, etc.
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For supplementary and high intensity lighting of small areas and machines.
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For soft, even, shadowless, glareless, illumination in indirect lighting fixtures.

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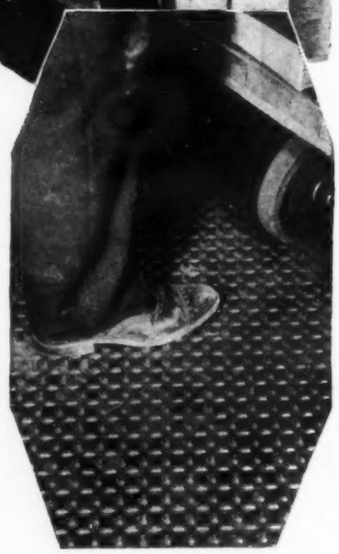
"WATCH YOUR STEP, DAD, your job is as dangerous as mine"

MANY a boy will come safely home from war to find his dad laid up from a fall or some other accident. Strange as it may seem, it was still *more* dangerous on the American home front in 1942 than it was on all our war fronts.

Falls caused from poor footing are responsible for a surprising number of these home and industrial casualties. With so many women and older men workers going into factory jobs, it is important to take every safety precaution.

U·S·S Multigrip Floor Plate furnishes firm footing in any direction. It is safe wet or dry. Lathe turnings, drill chips, oil or water can be easily removed with a minimum of effort.

Check carefully into the causes of accidents in your plant. Maybe a shipping platform, or a machine shop floor made of U·S·S Multigrip will be the means of keeping much-needed workers on the job.



FLAT-TOP DESIGN *is easy on the feet. It reduces fatigue yet assures safe footing at all times.*

U·S·S MULTIGRIP FLOOR PLATE

USS

CARNEGIE-ILLINOIS STEEL CORPORATION
Pittsburgh and Chicago
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

lateral and rotation sway, are described an illustrated in the new Bulletin No. 4 co sisting of 8 pages of pictures and technic information. The many industrial applic tions of this new method of handling larg units, as well as for ash and coal handlin in the boiler room are included along wit dimensional drawings and other helpful data. Cleveland Crane & Engineering Co.

–65–

OVERHEAD MONORAIL–How handlin problems have been solved with American Monorail is the subject of a new 48-page Bulletin recently issued. It presents in pic torial form many solutions to industrial hand ling problems. The equipment is illustrated along with application photographs showing i in use. The complete engineering service o the manufacturer is also described. Th American Monorail Co.

–66–

PAINT MAINTENANCE AND BUYIN GUIDE–This 153-page maintenance an buying guide, recently issued, contains a vas amount of helpful information to every plan operating official. Tips on inspection pro cedures for various parts of the plant, wh paints to use where, color charts, and misc laneous equipment used in painting are co ously covered. Pittsburgh Plate Glass Co.

–67–

PAINT SELECTOR–A 17″ x 22″ chart f selecting the right kind of maintenance pain for practically every industrial application, included as part of bulletin on Valdura Paint How to choose and use your maintenan paints in addition to handy paint estimati tables for interior and exterior surfaces, a mathematical tables for calculating dime sions is also included. Folder No. V4107 describes an asphalt paint for exterior su faces. Folder No. V4509D describes a pai for roof protection. American-Marietta Co.

–68–

PAINTS–The complete line of war-formu paints, specially developed to replace the wa fortified paints (for which certain raw mat rials are no longer available) is described i new Bulletin F-270. Specifications for ec nomical paint maintenance, helpful sugge tions on preparing surfaces to be painted, complete color chart of war-formula pain and the latest net industrial price list, are al incorporated. S. C. Johnson & Son, Inc.

–69–

PLANNED FOR PROFIT–A brief descri tion of the services of the company, which engaged in designing, building, and equippi chemical plants, pulp and paper mills, foo plants, heavy machine shops, power plant and other types of factory floor space, involv ing both standard and special design. H. Ferguson Co.

–70–

PLUMBING & HEATING REPLAC MENT PARTS–This 64 page catalog pr sents replacement parts for the maintenance existing plumbing and heating systems t gether with the required patented precisi tools and the "Sexauer-System." Over 3 specific kinds of replacement parts are list and described. J. A. Sexauer Mfg. Compan

–71–

PORTABLE CANTEENS–Three models portable canteens that bring food to the wor

Are You Having Trouble with Excess

Heat, Fumes, Moisture or Dust ?

Read How PROPELLAIR Ventilating Specialists Solved a Difficult Problem for Aluminum Company of America!

PROPELLAIR VENTILATING EQUIPMENT OFFERS THESE EXCLUSIVE ADVANTAGES

AXIAL, AIRFOIL PROPELLERS, especially designed by Propellair engineers, deliver maximum air with minimum horsepower. Air flow is even over all parts of the blades—the *whole* fan works, not just the tips! These unique propellers are also non-overloading—from free air to complete block-off, horsepower remains virtually constant as long as motor speed is constant. The number of blades, and their angle and shape, depend on the job to be done.

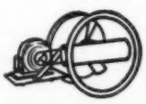
CURVED ENTRANCE RING

—as contrasted with ordinary straight-edge rings that serve merely as mounting devices—enables Propellair Fans to deliver considerably *more air per horsepower than other types.* Introduced in 1930, as a result of exhaustive experiments and tests by Propellair engineers, this design makes possible the utilization of the "Airfoil" air-movement principle in the *entrance ring* as well as in the *propeller.*

A PROPELLAIR FAN FOR EVERY APPLICATION!

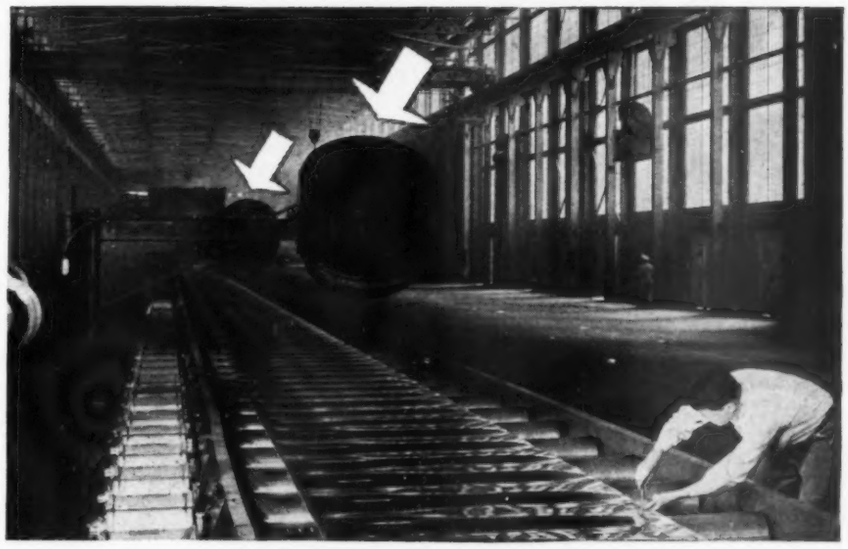
Pictured here are just three of *ten* different types of Propellair Fans. Each of the ten was developed for specific ventilating jobs—is guaranteed to perform them with utmost efficiency, dependability and economy.

CD—Direct connected to electric motors. For ducts, hoods, roof ventilators or panels.



CS—Heavy-duty complete belt-driven unit in duct section. For severe dust, corrosive or explosive vapors.

CU—Low-stand, tiltable, portable cradle fan. For hardening-room service, production-line drying or cooling.



This photo, taken by Aluminum Company of America, appeared in the Saturday Evening Post for January 2, as part of a feature article on America's war production.

Finished sheets of aluminum like this one, two city blocks long, were rolling out of Aluminum Company of America's great mills at temperatures much too hot for immediate handling. How could they be cooled—quickly and efficiently—without hampering output?

Alcoa engineers called in Propellair ventilating specialists, who recommended that 7½ h.p. Propellair Fans—delivering 22,400 cubic feet of air per minute—be installed above the moving sheets. Special drums were devised to direct *all* of the air onto the sheets, and the complete assemblies were mounted on special "jibs" to hold them in correct position. Now in constant operation, these Propellair Fans reduce the heat of the aluminum sheets 400°F. as they pass beneath!

In thousands of war plants everywhere, Propellair ventilating specialists have solved tough air-moving problems of many other types, too. Harmful, dust-laden air is removed—fumes and smoke are exhausted—cool air is circulated—heat is carried away or more evenly distributed.

Whatever *your* war-production ventilating problem, it can be solved skillfully and economically by Propellair men and equipment. Mail the coupon below for complete information!

Mail This Coupon Today!

PROPELLAIR INC.
"Moving Air Is Our Business"
SPRINGFIELD • OHIO

PROPELLAIR, INC., Springfield, Ohio

Please send me complete information on Propellair Ventilating Equipment.

Name..... *Position*.....

Firm Name.....

Street Address..... *City & State*.....

My ventilating problem involves:

☐ Heat ☐ Fumes ☐ Moisture ☐ Dust

To Help Maintain War Production

VALVES HYDRANTS

and

PIPE LINE ACCESSORIES

M & H products are well known for high quality material and expert workmanship. They have been used in industrial plants for many years. The M & H line also includes B & S Cast Iron Fttings, Flanged Fittings, Flange and Flare Fittings, Valve Boxes, Shear Gates, Wall Castings, Cutting-in Tees and similar accessories.

M & H Valves are used in industrial plants for water, gas, steam, oil, chemicals and are furnished in all commercial sizes from 2" to 30", inclusive. They are cast iron body, bronze mounted, furnished double disc parallel seat or solid wedge. They are heavily proportioned and have a high factor of safety.

OTHER M & H PRODUCTS

Fire Hydrants	Floor Stands
Gate Valves	Extension Stems
Tapping Valves	Mud Valves
Special Castings	Flap Valves
Tapping Sleeves	Sludge Shoes
Check Valves	

Write for Catalog 34

M & H VALVE

AND FITTINGS COMPANY

ANNISTON, ALABAMA

ers are illustrated and described in the new 12-page bulletin, "War-Busy America Eats Where It Works". Not only is each model illustrated, but complete mechanical specifications and identifying drawing accompanies each. Albert Pick Co. Inc.

–72–

PORTABLE ELECTRIC TOOLS–A new 1942 Defense Catalog illustrating and describing complete lines of Skilsaw tools now available. Describes practical applications for these tools, and shows the savings possible in maintenance and production with portable electric hand saws, belt sanders, disc, sanders, drills, etc. Skilsaw, Inc.

–73–

PREVENTATIVE ELECTRICAL MAINTENANCE – Because wartime restrictions make copper products hard to get, the preventative maintenance plan described in the manual entitled "Preventative Maintenance" will aid in protecting cables within the plant. It provides a practical automatic method for complete analysis of circuits and equipment . . . uncovers potential weaknesses . . . methods for correcting them . . . with charts to enable quick periodic check-up. Through the use of this preventative maintenance plan it may be possible to uncover the necessary evidence to obtain an "emergency repair priority"– Anaconda Wire & Cable Co.

–74–

Q-FLOOR WIRING–Electrical fittings and accessories to utilize the cells of Robertson Q-Floor as an electrical underfloor distribution system are illustrated and described in the 44-page Bulletin No. 53–32 of recent issue. One section of this booklet is devoted solely to technical data on Q-Floor Wiring including 4 pages of questions and answers that normally arise about this type of wiring. Another section is devoted to detailed descriptions of the various fittings and accessories used in the system. The balance of the booklet is devoted to two sections: Layout Design Data and Installation Data. General Electric Company.

–75–

ROOF VENTILATORS–Six distinct types of roof ventilators are fully described and illustrated in the 8-page bulletin SPV-101-A, in addition to dampers, controls and ventilator bases. Complete details about continuous ridge, free-flow gravity, standard gravity, free-flow fan, standard fan and revolving gravity ventilators are included along with specifications, design and structural features. The Burt Manufacturing Co.

–76–

ROOF VENTILATORS–A complete line of roof ventilators made of non-critical materials is fully described in a new 8-page Catalog recently issued. The various ventilator designs are patterned after the original metal ones and are for use in essential applications where metal is not vitally necessary. The catalog contains full descriptions of the various items, illustrations, technical and engineering data, and a description of the manufacturer's engineering service. The Swartwout Co.

–77–

ROOFING–Condensed Built-Up Roofing Specifications which cover every type of roof construction in complete and comprehensive

★ ★ ★ ★ ★ ★ ★ ★ ★

CLEAN *your* FLOORS

this EASIER Oakite way

Whether you wash your floors manually or with an electric floor scrubbing machine, you will find you can do this job EASIER, FASTER, BETTER by using

OAKITE PENETRANT

Because of its vigorous detergent action and emulsifying properties, this FAST-WORKING, FREE-RINSING material makes QUICK work of removing ALL oil, grease and other deposits. Note these THREE big advantages you get!

Helps Prevent Accidents!

Oakite-washed floors are left in CLEAN, non-slippery, film-free condition . . . SAFE to walk on.

Reduces Fire Hazards!

Water-soluble Oakite Penetrant removes fire-hazardous oil and grease accumulations, thereby eliminating fires that may be caused by spontaneous combustion, carelessness, etc.

Improves Working Conditions!

Clean floors improve plant sanitation . . . directly aid plant morale . . . help keep production moving along on schedule.

Write today for FREE DIGEST giving time-conserving, effort-saving short cuts on 40 other essential maintenance jobs.

OAKITE PRODUCTS, INC.
14A Thames Street, New York, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*

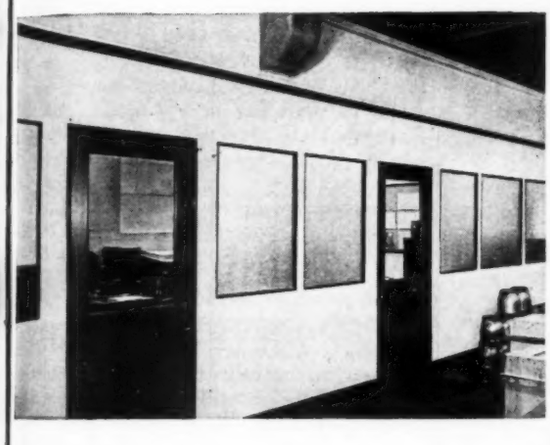
Buy Bonds for Victory

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

These men are speeding

War Production

by the quick erection of needed plant offices with J-M Movable Transite Partitions



IT'S surprising how quickly plant offices can be constructed when Johns-Manville Transite Walls are used. These modern movable partitions provide sturdiness and complete privacy . . . yet permit offices to be erected almost overnight. Economical to buy. Practically no upkeep expense. Look at all these other advantages . . .

100% SALVAGE if relocation is necessary. The use of interchangeable parts assures maximum re-use of all materials.

VIRTUALLY ABUSE-PROOF. Transite Walls made of asbestos and cement are highly resistant to shock and impact, and provide a complete wall panel of exceptional durability.

PLEASING APPEARANCE. Perfect for plant or general office use because of their modern lines and flush streamlined appearance. Color is light gray—can be painted if desired. Permanent finish.

FORMS ANY TYPE PARTITION. Solid or in combination with glass—ceiling-high or free-standing.

For details on J-M Transite Walls, see our Catalog in Sweet's, or write for brochure TR-22A, Johns-Manville, 22 East 40th Street, New York, N. Y.

J-M Transite Movable Asbestos Walls—J-M Acoustical Materials—J-M Asphalt Tile Floors are making an important contribution to speeding up war production in offices and plants everywhere.

JOHNS-MANVILLE

Asbestos

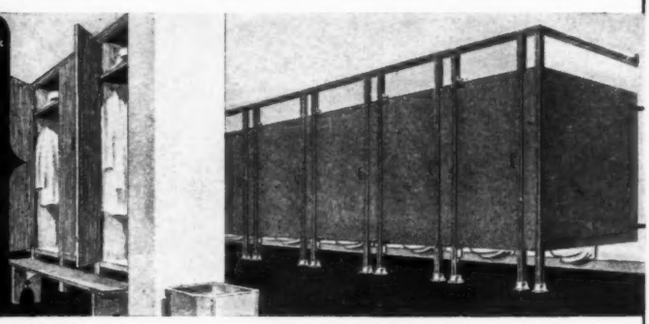
Transite Walls

BELLYACHERS or BOOSTERS?

"I tell yuh, those birds in the front office don't know we're alive!

Now that there's two or three times as many men in the plant—and women, too—they ain't got nearly enough toilets. And you can't even find a locker to hang your clothes in. Look at all the time yuh waste—right now, when everybody's tryin' to keep up and do a real job!"

Sanymetal*
ALL-WOOD Toilet Compartments
With Complete Door Hardware and Partition Fittings



Inadequate toilet facilities lead to irregular habits and lost time—invite fatigue and sickness—create inconvenience and cause irritation, indisposition and resentment. Sanymetal All-Wood Toilet Compartments provide privacy, convenience, protective sanitation, and these advantages:

SAVE TIME AND MONEY: No need to design or attempt to build makeshift toilet compartments. Sanymetal Specialists have worked out a standard flush type compartment of economical design that can be made from the materials available today, and furnished complete with door hardware and partition fittings.

CONVENIENCE AND SANITATION are embodied in Sanymetal All-Wood Toilet Compartments in a degree unappreciated, unapproached, and usually overlooked by those lacking Sanymetal's 27 years of specialized experience in this line.

ENGINEERED-IN-WOOD FEATURES provide a strong, rigid installation, free from dirt-collecting pockets and ledges, and comparatively easy to keep clean.

ONE ORDER, ONE PRIORITY, COVERS THE DELIVERY OF EVERYTHING YOU NEED, even complete door hardware and partition fittings.

COMES READY TO INSTALL without trial erection or aggravating attempts to assemble materials.

Allow neither neglect nor inadequacy of toilet and washroom facilities to impede or retard production of war goods. Safeguard the health of your workers.

Write for Bulletin No. 900 for complete information on Sanymetal All-Wood Toilet Compartments. For quick action see "Partitions" in your phone book for Sanymetal Representative.

THE SANYMETAL PRODUCTS CO., INC., 1707 Urbana Rd., Cleveland, Ohio

Sanymetal* LOCKERS

OF PRESSED HARD FIBREBOARD
AVAILABLE IN SINGLE AND DOUBLE TIER TYPES

By utilizing Sanymetal Lockers you may obtain these advantages: **SAVE TIME AND MONEY:** Standard types and sizes available for prompt shipment. No need to design or build makeshift compartments. **PROTECTION, CONVENIENCE AND SANITATION** in an unusual degree because of rigid, reinforced construction. **QUICKLY ASSEMBLED INTO INSTALLATION:** Assembly of sides and pilasters and most of hardware before shipment reduces installation time. **WARTIME RANGE OF TYPES AND SIZES** to meet requirements of 10 or 10,000 employees.

Write for Bulletin No. 920 for complete data on Sanymetal Lockers or send blueprints of layout for quotation.

THE SANYMETAL PRODUCTS CO., INC.
1707 Urbana Road, Cleveland, Ohio

Please Rush by return mail your new Bulletin on:

☐ Sanymetal All-Wood Toilet Compartments —Bulletin No. 900

☐ Sanymetal Pressed Hard Fibreboard Lockers—Bulletin No. 920

Name_____ Position_____

Firm_____

Address_____

City_____ State_____

manner are described in a 20-page Bulletin "Specifications for Bonded 10–15–20 Year Roofs". The booklet is devoted to 26 complete engineering specifications with illustrations. Bonded flashing details, Elastite flashing system, roof insulation for application over wood, concrete and steel decks, and special construction recommendations are also included. The Philip Carey Company.

–78–

ROOFS—Roof decks adapted to war construction of industrial plants are described in Bulletin No. 4519. Gypsum Roof Deck Slabs, Poured Gypsum Roof Decks, and Cemesto Insulating Roof Decks are fully covered in the detailed specifications included in this bulletin. The Celotex Corporation.

–79–

RUBBER JOINTS FOR STONEWARE PIPING—This 20-page, informative Bulletin No. 902 covers the many applications of these molded rubber rings which grip the bell and spigot of chemical stoneware piping. Method of application of this material is fully covered. To be fully satisfactory, these rubber rings must be used with U. S. Stoneware Piping. Complete specifications and ordering information. U. S. Stoneware Co.

–80–

SOUND CONDITIONING—How to get more out of the available manpower in industry is described in a 12-page, profusely illustrated brochure on Sound Conditioning. The ill effects of noise and the effect which noise has on the efficiency of workers can be reduced by proven methods. A sound conditioning service is also described in this booklet, No. 5301. The Celotex Corporation.

–81–

SOUND CONTROL—Control of sound is the subject of this new 16 page bulletin which discusses, among other things, noise quieting—vibration isolation—and acoustical correction. Containing more than 16 installation pictures, its detailed discussion of the necessary material for sound control should be of interest to every plant operating man. Johns-Manville.

–82–

SOUND SYSTEMS—New, 28-page catalog includes products which are now currently used in sound installations carrying priorities. Illustrations and complete specifications on more than 80 specific items. Suggestion for loudspeaker matching. Tube complements. Accessories. Radio Corporation of America.

–83–

SPECIFICATIONS FOR LIGHTING IN WAR PRODUCTION—A new manual gives concise, up-to-the-minute data about better lighting as a war production tool. Tells how Lighting Specifications can be applied under today's conditions. Explains how to approach lighting problems, how to analyze the seeing task, etc. Contains 20 actual problems and their solutions. Benjamin Electric Co.

–84–

STEEL FLOOR PLATE—This 16-page booklet furnishes complete data on five Rolled Steel Floor Plate patterns designed to meet every possible flooring problem in industry. The engineering service of the manufacturer is described. Alan Wood Steel Co.

Yes, I Specified Hillyard *Floor Treatments and Maintenance Products for your floors*

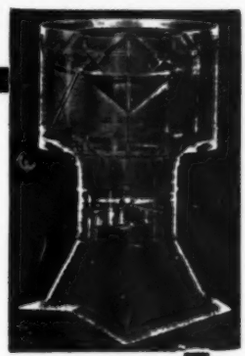
Wire or phone us today for a Hillyard Maintenance Engineer, his advice and recommendations are freely given . . . . no obligation at all. We have Nation wide Maintenance Service. Call us today.

Factory floors now, more than ever, need the best floor protection they can get. For many years industrial concerns have used Hillyard Floor Treatments and Maintenance Products with best results. Leading Architects have specified Hillyard Products and foremost flooring contractors also endorse and approve Hillyards Hi-Quality Products. No matter what material your floor is made of . . . Hillyards have Floor Treatments and Maintenance Products to fill the need of proper care and longer life for the floor.

HILLYARD SALES COMPANY

...DISTRIBUTORS HILLYARD CHEMICAL CO. ... ST. JOSEPH, MO. ... BRANCHES IN PRINCIPAL CITIES...

FREE-FLOW FAN



BURT

VENTILATORS BETTER THAN EXTRA MEN

To secure greater production, first equip your plant with Burt Ventilators. You will find improved ventilation contributes materially to step up output, cut down accidents and reduce spoilage. Workers are happier and enjoy better health. Burt Ventilators are made in all types for industrial and commercial applications, are scientifically designed for top efficiency, and substantially made to give long-time service.

Call freely on Burt Engineers for advice on ventilation problems.

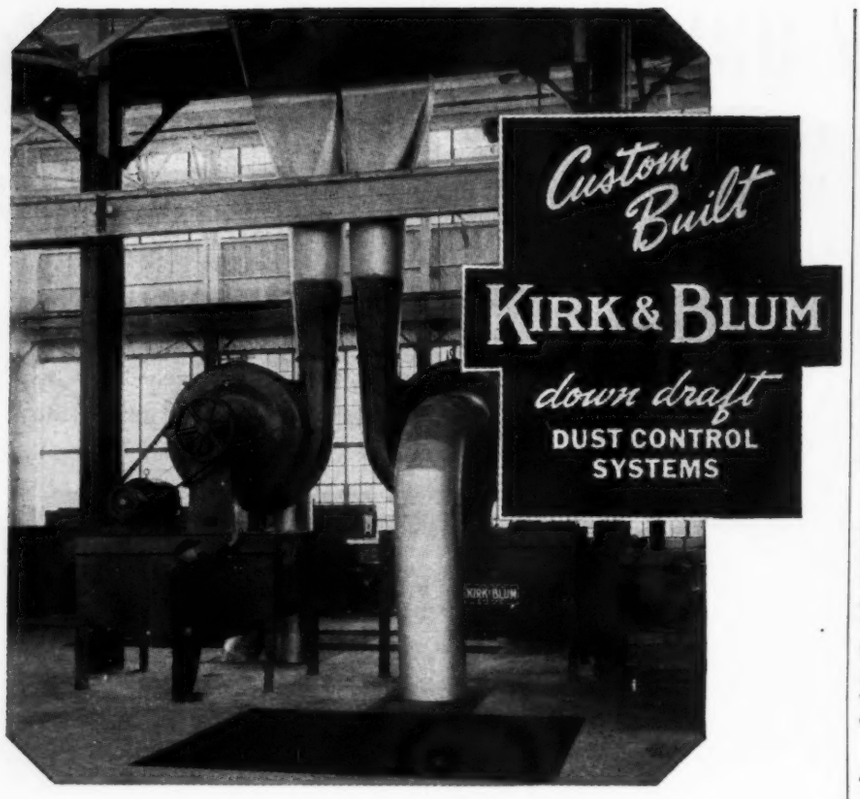
THE BURT MFG. CO.
ROOF VENTILATORS • OIL FILTERS
EXHAUST HEADS
955 So. High St. Akron, Ohio

SEND FOR CATALOGS
Burt Engineers are glad to help on plans

TISSUE TIPS by VICTORIA

Specify VICTORIA TOILET TISSUES

Single Fold, Double Fold or Black Core—for dependable quality.
Victoria Paper Mills Co., Fulton, N.Y. Craftsmen in paper-making since 1880.



speed and efficiency increased in grinding operations at large planer plant

Limited floor space available at The G. A. Gray Co., manufacturers of large planers, called for compactness in designing a dust collecting system that would retain all the efficiency so characteristic of Kirk & Blum Systems. Our engineers designed a down-draft system composed of two units, as shown above.

These units, served by American Air Filter Roto-Clones, exhaust from three floor, "Down-Draft Stations". System in background is for the express purpose of long planer bed cleaning, and permits men to grind each side of planer simultaneously.

The "Down-Draft Station" in foreground handles all odd size castings, such as columns, housings, rails, etc., and is of sufficient size to permit several men to grind. This arrangement saves time and increases production. The metal dust from grinders is captured at its source and drawn into hoppers under the floor, while cleaned air is discharged into outside atmosphere.

Results of this installation are proving the soundness of Kirk & Blum's judgment in applying the correct principle to fit the individual job.

Send for any of these Booklets:

"Dust Collecting Systems in Metal Industries"
"Fan Systems for Various Industries"
"Blower Systems for Woodworking Plants"
"Industrial Ovens"
"Cooling Systems for the Glass Industry"
"Data on Kirk & Blum Production Facilities"

THE KIRK & BLUM MANUFACTURING CO.
AN ORGANIZATION OF ENGINEERS AND MECHANICS
2835 SPRING GROVE AVE. CINCINNATI, OHIO

–85–

STONEWALL BOARD—This new building material, which is an asbestos cement product that is rust-proof, rat-proof, rot-proof, termite-proof and unburnable, is described in Bulletin No. 1190. Full application data of this material for industrial uses and available board sizes included. The Ruberoid Co.

–86–

STRIP STEEL—Up-to-date information on Strip steel as a building material is described in Catalog File No. 13-G. This material is now rolled to a curve in the same operation which forms the nailing groove. C-Sections can be rolled in a variety of thicknesses for design requirements. This bulletin contains full application data, specifications and detail drawings on nailable and C-sections. Great Lakes Steel Corp.

–87–

SURFACE WIRING DEVICES—Devices that meet all requirements on every surface wiring job with cables exposed or hidden are described in the new Bulletin No. 54-22. With these devices furnished on priority only, the bulletin contains descriptions of the complete line, ordering information and reference wiring diagrams for installation of them. General Electric Company.

–88–

THREE DIMENSIONAL SEEING – The part which three dimensional seeing can play in speeding production through the use of Color and Light in the right combination, is fully illustrated and described in the new 16-page Bulletin No. A-3342. Depicting how three dimensional seeing affects production, interesting application photographs demonstrate the value of color on production machine. Other industrial uses and advantages of color include floors, safety markings, dados and piping. An ingenious color selector is described as are methods for salvaging waste light. E. I. duPont de Nemours & Co.

–89–

TIMBER CONNECTOR CONSTRUCTION—"Typical Designs of Timber Structures," a reference book for plant engineers and building superintendents, shows details of 45 typical timber designs for roof trusses, bridges, towers, and other structures made possible by TECO system of timber engineering. Timber Engineering Company.

–90–

"TIMELY WARTIME TIPS ON FLUORESCENT MAINTENANCE" – This booklet outlines a regular maintenance routine for getting maximum lighting service from a fluorescent installation. It tells how to determine the frequency of a regular cleaning schedule, how to figure the number of lamp replacements per month. It gives the steps to follow in a regular checking system before discussing equipment, and many other valuable suggestions. Sylvania Electric Products, Inc.

–91–

TRANSITE WALLS—This new Bulletin TR-32A discusses the many applications of Transite walls in industry. It contains over 15 application photographs, 4 erection photographs, several pages of detailed drawings and plans, in addition to much general useful information on wall and partition construction. Johns-Manville.

–92–

UNIT HEATERS—Two new specification sheets describe Carrier Vertical Discharge and Horizontal Discharge Unit Heaters. Bulletin 46E-20 illustrates and fully covers the Horizontal Discharge Unit Heater. This type has the advantage of installations where headroom is at a premium because the piping is on the side of the heater. Dimensions and dimensional drawings, steam ratings and BTU constant charts also included. Bulletin 46S-4 covers the 5-Way Vertical Discharge Unit Heater with easily adjustable outlets which permit varying the direction, distance and velocity of warm air distribution. Full technical information. Carrier Corporation.

–93–

UNIT HEATERS—Horizontal and Vertical Delivery Unit Heaters are illustrated and described in separate 8-page Bulletins No. 142-B and 142-C. Each bulletin fully discusses the mechanical construction of the heater, technical information, engineering charts for determining capacities, dimensions and weights. Modine Manufacturing Co.

–94–

UNIT HEATERS—The principle, design and operating features of Wing Featherweight unit heaters described and illustrated in a 16-page Catalog. Contains numerous installation photographs, engineering tables, elevations, and complete specification data with list of typical users. L. J. Wing Mfg. Co.

–95–

VACUUM FOOD CARRIERS—Bench service of hot foods, soups, coffee and other cold or hot liquids for war plant workers made possible through the use of vacuum insulated carriers, are described and illustrated on two descriptive sheets. Interesting application photographs, cutaway view of the carrier and other valuable data are included. Vacuum Can Company.

–96–

VALVES, BOILER MOUNTINGS, LUBRICATING DEVICES—Catalog 78, 136 pages, includes Bronze, Iron and Steel Valves, Boiler Mountings, Lubricating Devices, Air Devices and numerous other specialties. Technical and dimensional data; thermodynamic properties of steam. Lunkenheimer Guide No. 555 is a valuable aid in selecting Valves, Boiler Mountings and Lubricating Devices. Products grouped by pressure, type and use. The Lunkenheimer Co.

–97–

VALVES, DRAINS, BY-PASSES—Where to use valves, drains and by-passes is the subject of this new 32-page booklet. It tells which valve to use . . . differences among various types of valves . . . the fundamentals of valve designs and applications . . . where to use by-passes and drains—metal compositions of Jenkins valves . . . and lists A.S.M.E. Power Boiler Code Valves. Jenkins Bros.

–98–

VALVES, FITTINGS—A complete line of steel safety fittings for tubing that carries pressure is described in the 28-page Catalog E-402. More than 13 specific types of pressure fittings that need no flaring, threading, welding or soldering are illustrated and covered by complete specifications. Catalog J-104-D contains more than 600 specific re-

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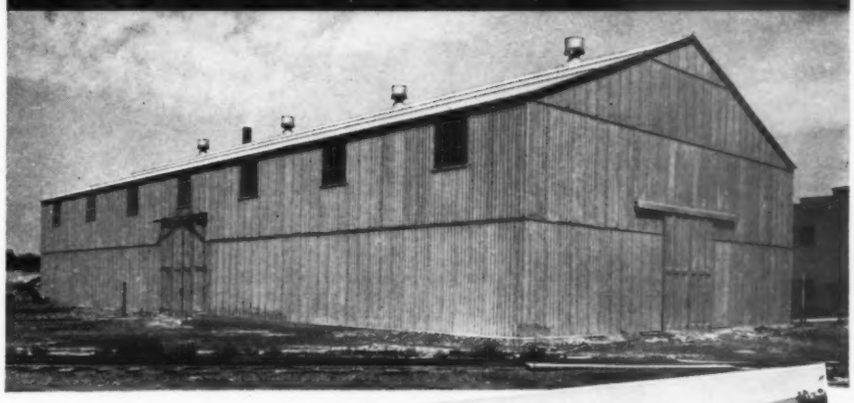

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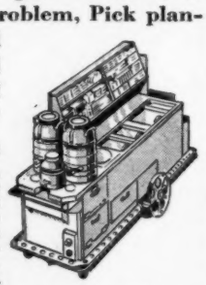

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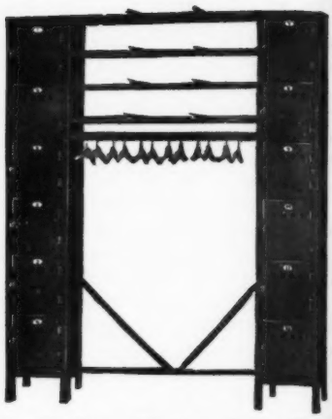

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